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This study was conducted under the general supervision of Kenneth H. Field, Chief, Food Distribution Research Laboratory, Agricultural Research Service.

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FOOD DISTRIBUTION FACILITIES FOR ASHEVILLE, NORTH CAROLINA

By Richard K. Overheim, James N. Morris, Jr., Clarence E. Harris,
H. Ronald Smalley, and Charles F. Stewart 1/

SUMMARY

This study was undertaken in the summer of 1974 to help plan an improved farmers' market and wholesale food distribution facilities at Asheville, N.C., to replace old, obsolete facilities that no longer met the needs of modern food marketing.

Food moving through the Asheville area was handled by 37 independent wholesale firms and 9 food chains.

The independent wholesalers had one or more wholesale facilities and sold directly to outlets they did not own or control. Their firms included the following: Fresh fruits and vegetables 5, meat and meat products 4, dairy and poultry products 5, groceries 13, fluid milk products 6, and bakery products 4

The total volume of direct receipts handled by independent wholesale food firms was over 237,000 tons. Excluding fluid milk products, over 80 percent of this tonnage was received directly from out-of-State sources. Of the total tonnage, 91 percent arrived by truck and 9 percent by rail.

Three national food chains served Asheville from outside the area, primarily from Charlotte, N.C., Atlanta, Ga., and Greenville, S.C. Six local food chains operated within the Asheville area, one of which was a large full-line distributor. The others supplied principally convenience stores and were not full-line distributors.

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Of the total volume of all food products handled, 27 percent was distributed within the Asheville area, 51 percent outside the area but within the State, and 22 percent outside the State, primarily to nearby sections of Virginia, Tennessee, Georgia, and South Carolina. Eighty-seven percent of the volume of all food products was delivered by the wholesalers.

As a result of the inadequacies or obsolescence of the facilities, there were inefficiencies that could be improved in the handling of food products. Although the location of the Lexington Avenue and the Riverside Farmers' Markets provided excellent highway access, the markets were at separate locations and buyers had to travel the distance from one market to the other or shop at only one market.

To meet the needs of farmers and grocers in the area and firms requiring improved facilities, a new farmers' market and a center for wholesale food distribution were recommended. The plan included a farmers' market with two buildings totaling 23,520 square feet of space, two multiple-occupancy buildings totaling 33,000 square feet of space, and five single-occupancy buildings totaling 54,600 square feet of first-floor space.

The entire development would require approximately 30 acres for the proposed farmers' market, farmers' market-related section, wholesale market, and support facilities and would include about 8½ acres for future expansion.

Estimated annual rentals, assuming a 30-year amortization period, would range from \$2.71 to \$3.40 per square foot depending on the interest rates at the time of financing.

Income from the sale of fruits and vegetables in the 20-county study area was about \$35 million in 1973. At the current growth rate, this could more than double in 10 years.

A new well-planned farmers' market and wholesale food distribution center would have the necessary type, size, and number of facilities needed by the farmers and wholesalers in the Asheville area both now and in the foreseeable future. In addition, these facilities would help the wholesalers to comply with regulations concerning sanitation, quality standards, safety, and the environment—all of which are of vital concern to the community.

INTRODUCTION

The North Carolina State Department of Agriculture, the Western North Carolina Development Association, the Land of Sky Regional Council, and food industry representatives requested assistance from the U.S. Department of Agriculture in planning an improved farmers' market and other facilities for wholesale food distribution to serve western North Carolina. The need for these facilities was increased by the possibility that the present Lexington Avenue Market might have to relocate in order to improve the highway access to the new civic arena.

The Food Distribution Research Laboratory of the Agricultural Research Service undertook field work that covered 20 western North Carolina counties (see fig. 1) in the summer of 1974.



Figure 1.--Food distribution study area--western North Carolina.

All data relating to growers and grower use of the Asheville markets were collected with the assistance of the North Carolina State Department of Agriculture and the extension service through its county agents.

The study had the following objectives:

- ° To analyze the present farmers' markets in Asheville and determine the kind of facilities needed to serve growers in 20 surrounding counties.
- ° To analyze present wholesale food distribution facilities in the Asheville area and determine what new facilities were needed.
- ° To develop a plan for new facilities that would meet the immediate needs and provide for future growth.
- ° To identify possible sites for efficient food marketing in the area.
- ° To estimate the costs of constructing and operating a new facility development.

ECONOMIC FACTORS AFFECTING FOOD MARKETING

Population, Location, and Manufacturing 2/

The population in the 20-county study area totaled 632,653 in 1970. This was an increase since 1960 of 53,007 or 8.4 percent (appendix table 14).

Buncombe County, where Asheville is located, had the largest population. It is the marketing center for western North Carolina (fig. 2).

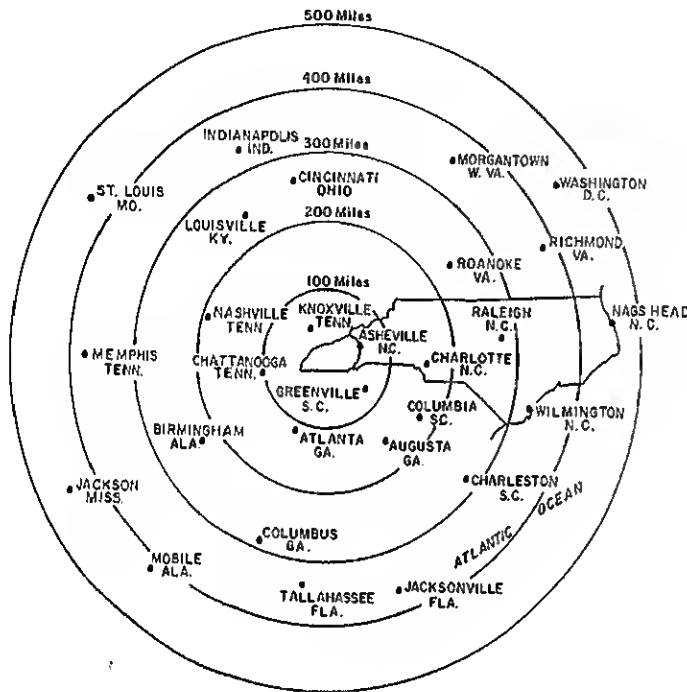


Figure 2.--Distances from Asheville, N.C., to various cities in the region.

The city of Asheville operates the municipal airport located between Asheville and Hendersonville, N.C. This major western North Carolina airport is served by three airlines.

Over 40 freight trains daily are provided by the Southern Railway. Approximately 40 percent originate in Asheville.

In 1973 there were 171 manufacturing firms in Buncombe County employing more than 21,710 wage and salaried workers at over \$143 million annually, as compared with \$100 million in 1966.

Importance of Agriculture 3/

Production of horticultural crops is increasing in importance in western North Carolina. The production and sales vary considerably from year to year owing to weather, prices, and other factors. Estimated income from farm sales of greenhouse and nursery products totaled \$7,321,327 in 1971, \$8,457,180 in 1972, and \$9,734,545 in 1973.

Estimated income from sales of fruits and vegetables in western North Carolina amounted to almost \$35 million in 1973 compared with \$27 million in 1972 and \$23 million in 1971 (appendix table 15). All other crop income, including that from tobacco, cotton, peanuts, corn, soybeans, potatoes, hay and other crops, and farm forestry, was estimated at \$50, \$36, and \$32 million in 1973, 1972, and 1971, respectively. Total crop income from sale of farm products for the western North Carolina study area was estimated to be \$85, \$63, and \$54 million in 1973, 1972, and 1971, respectively. For estimates by county, see appendix table 16.

FARMERS' MARKETS

Lexington Avenue Market

The Lexington Avenue Market remains virtually unchanged since it opened for business in 1938 (fig. 3). It has less than 1 acre of land. The lot extends north along North Lexington Avenue about 460 feet from the corner of Hiwassee Street. The depth of the lot averages about 80 feet. The market area is paved with concrete. A concrete retaining wall extends along the rear property line. The wall at its low point near the corner of Hiwassee Street is about 4 feet high, rising to a maximum of about 20 feet near the central point and then gradually becoming lower toward the northeast corner of the market.

3/ North Carolina Extension Service, North Carolina State University, Raleigh, estimated income from sale of farm products and government payments by county, extension district, and State of North Carolina for 1971, 1972, and 1973 as reported by county agents.



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Figure 3.--Lexington Avenue Market.

The retail stalls are at the front of the market along the sidewalk on North Lexington Avenue, beginning about 75 feet from the corner of Hiawasse Street and continuing slightly more than half the length of the market property. They are protected by a covered shed 200 feet long and 14 feet wide. The shed is of center-pole construction, 14 feet high at the ridge pole and 12 feet high at the eaves. The roof is of corrugated steel. Each end and the rear of the structure have been enclosed with corrugated steel; the front remains open. Some cloth material is pulled across the front when the market is closed.

Five individuals rent all the space in the retail shed. Each of five retail stalls has a frontage of 40 feet and a depth of 14 feet, amounting to 560 square feet per stall or a total of 2,800 square feet within the retail shed.

A small covered stand has been set up at the north end of the market for a horticultural dealer, who specializes in vegetable plants, hanging baskets, and outdoor flower garden plants and supplies.

There were 49 uncovered spaces from which farmers and truckers could sell their produce at one time, but there are fewer now because of the space occupied by the horticultural crop stand. The pavement behind the retail

stalls is marked off into 20 open stalls, each 10 feet wide, that are utilized mostly for automobile parking. There are 14 more open stalls north of the retail shed along Lexington Avenue, each 10 feet wide with an average depth of 35 feet. This area is usually occupied by small covered trucks. A one-way street for southbound traffic separates the open stalls behind the sheds and those fronting on North Lexington Avenue from about 30 other open stalls that are marked off from the rear boundary wall. The open stalls at the north end are 10 feet wide and average 30 feet deep, and those at the south end are 10 feet wide and only about 20 feet deep.

A small brick building adjoining the retaining wall was used as an office for the market master when the market was under the supervision of the Asheville Department of Public Works.

The Lexington Avenue Market area is an extremely busy section of the city. North Lexington Avenue, which runs parallel to the market, is a two-way major access street to the expressway. The kind of market vehicles utilizing North Lexington Avenue during 1974 is shown in figure 4. Trucks are usually parked

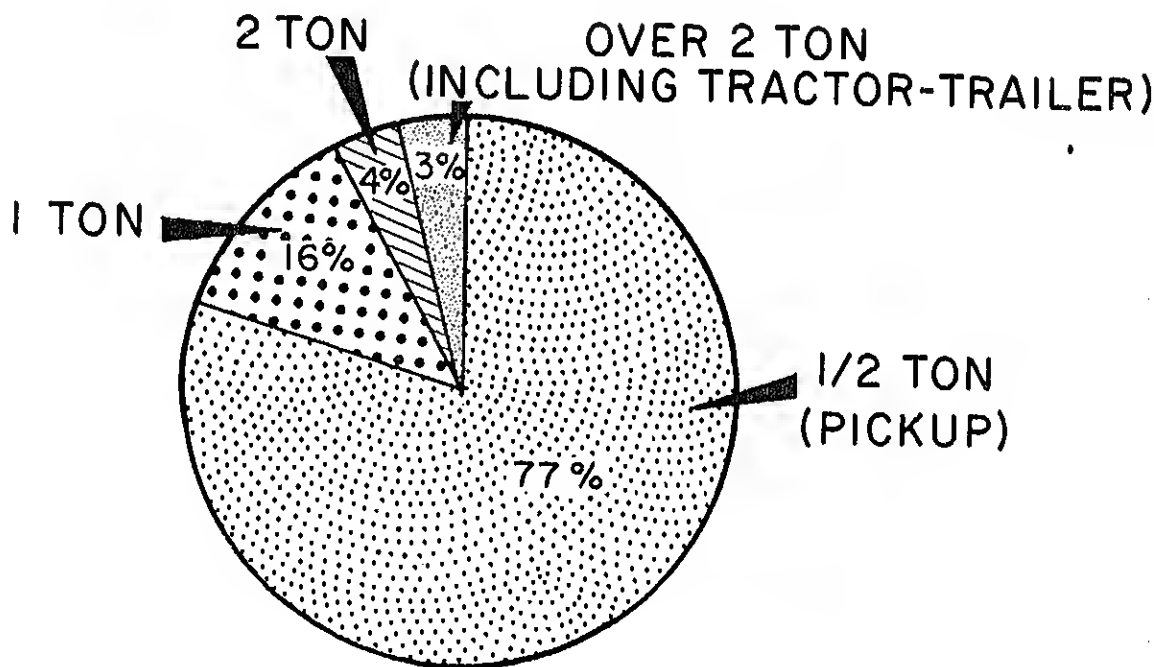


Figure 4.--Vehicle use by type, North Lexington Avenue Market, 1974.

on the street in front of the wholesale fresh fruit and vegetable buildings, which are adjacent to the market. The unloading of large tractor-trailers further blocks the street. Large over-the-road trucks loaded with out-of-State produce cannot enter the market property because it cannot accommodate

them. They must park in the street and either unload or sell their produce directly from the truck.

Figure 5 shows a typical flow of motor traffic in the area. Traffic

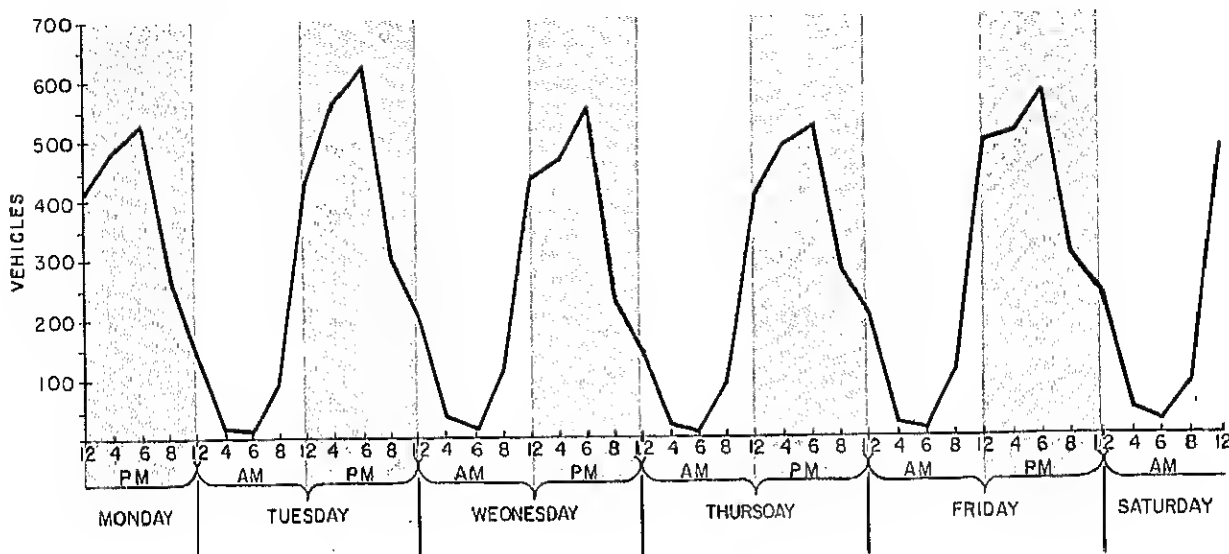


Figure 5.--Number of vehicles in the Lexington Avenue Market area by hour and day.

between 4 and 6 a.m. was the lightest recorded; the lowest count was at 6 a.m. The highest traffic counts recorded were at 6 p.m., reflecting the peak of the evening rush hour. The number of passenger cars in the area increased sharply between 6 and 8 a.m.

Riverside Market

The Riverside Market has about 4 acres of land. It consists of stalls built along an old tobacco warehouse located next to the French Broad River (fig. 6). The stalls are about 15 feet wide and extend the entire length of the 380-foot warehouse. The river runs along the west side and to the rear of the property.

There are 32 covered retail stands from which farmers and truckers sell both wholesale and retail. Retail stalls extend along the front of the building facing Riverside Drive and beginning about 65 feet from the Southern Railway main line, which is at the front of the property. The 32 retail stands are protected by an open shed extending the full 380-foot length of the warehouse. The shed, which is attached to the tobacco warehouse, is about 15 feet high at the eaves. The slanting roof of the shed is of corrugated steel

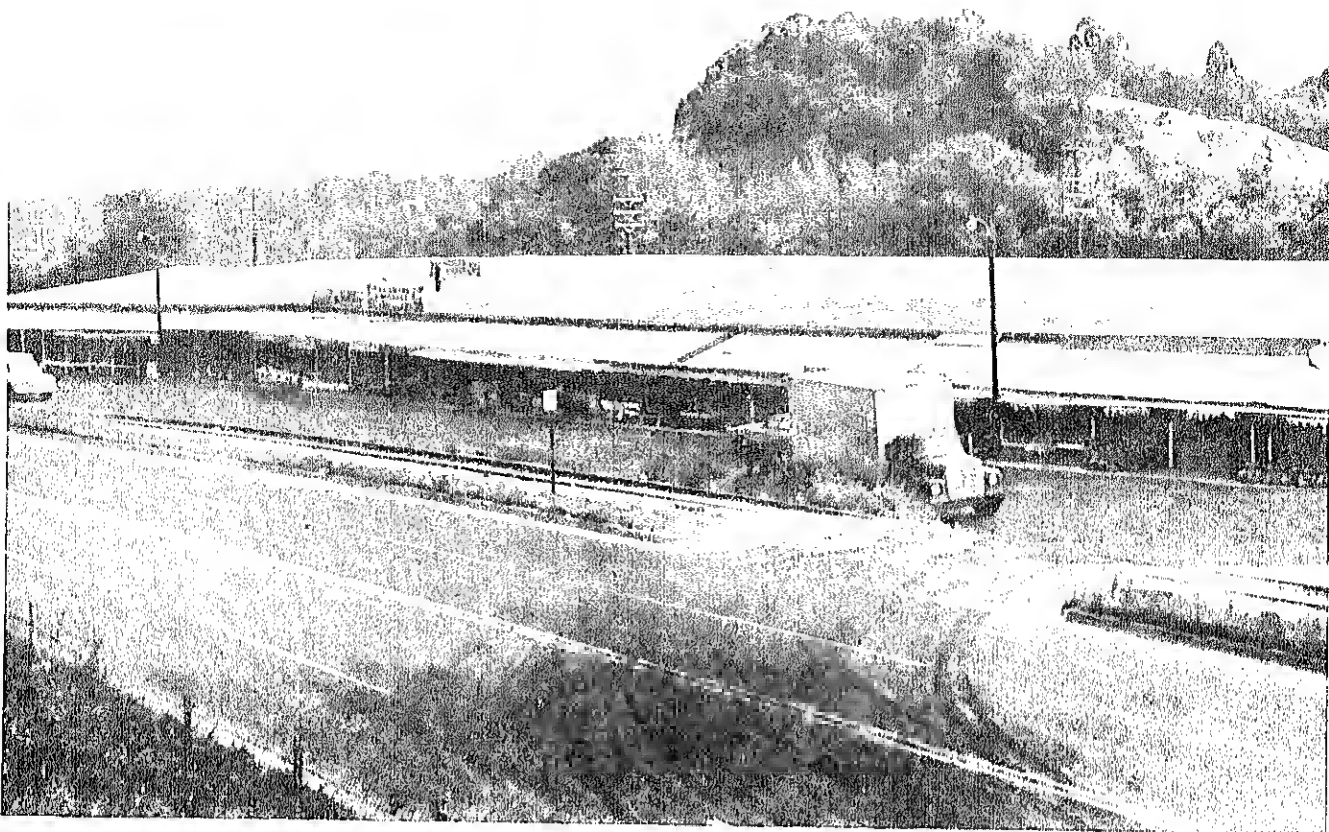


Figure 6.--Riverside Market.

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and extends from under the eaves and the entire length of the tobacco warehouse. The eaves of the shed are about 7 feet above the dirt floor of the market. Each retail stand has a frontage of about 12 feet and a depth of 12' feet.

WHOLESALE FOOD FACILITIES

Type and Number of Firms and Volume Handled

Food moving through the Asheville area was handled by 37 independent wholesale firms and 9 food chains.

Independent wholesalers are defined as those who have one or more wholesale facilities and sell directly to outlets they do not own or control. Table 1 shows the type and number of each firm. The volume handled by the independents totaled over 237,000 tons, of which approximately 91 percent was received by truck and 9 percent by rail. Figure 7 shows the location of these firms. Unless otherwise noted, all subsequent mention of wholesale firms in this report refers to the independent companies.

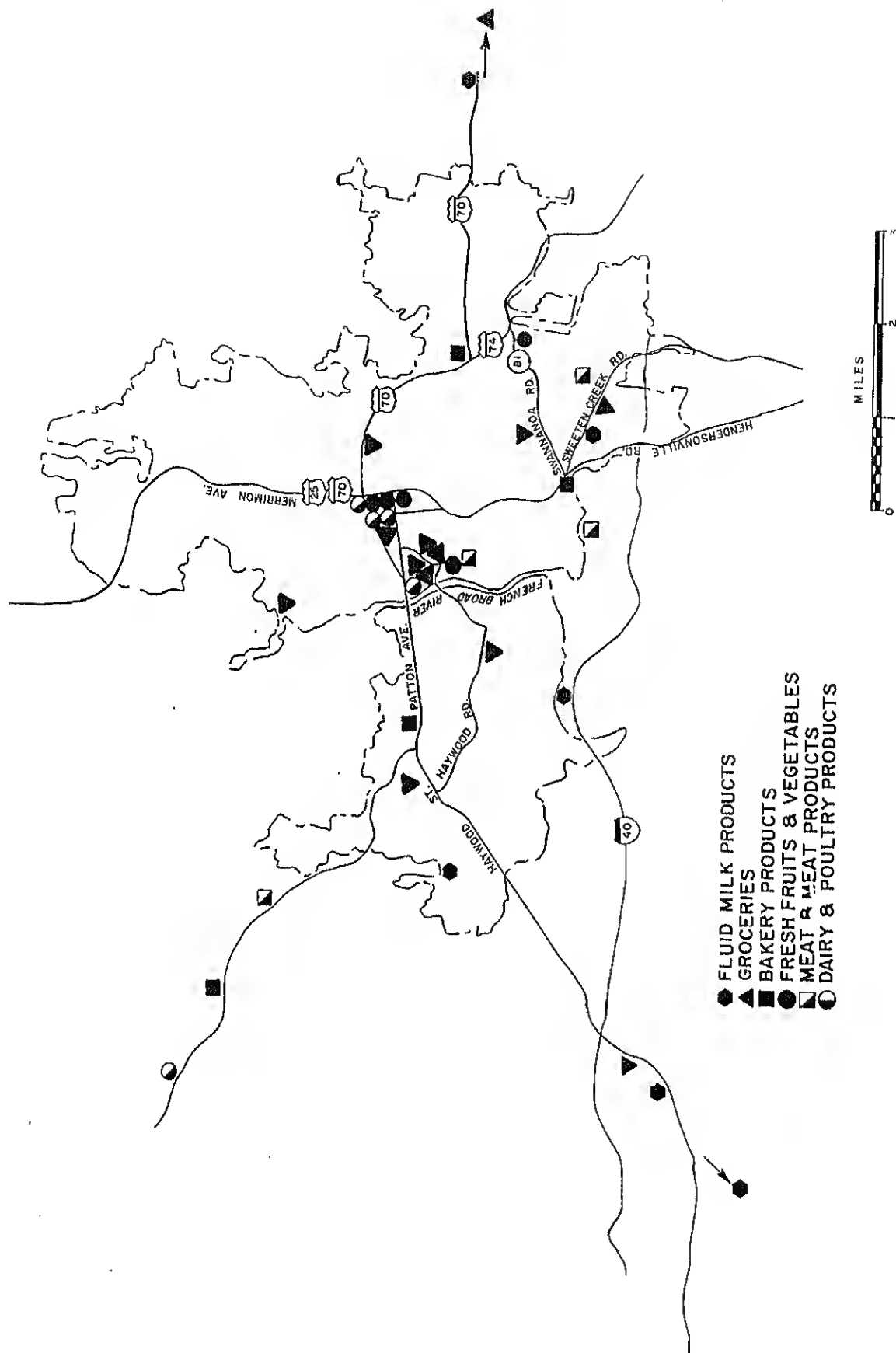


Figure 7.—Location of 37 independent wholesale firms, Asheville, N.C.

TABLE 1.--Type and number of wholesale food firms and estimated volume of direct receipts by method of transportation, Asheville, N.C.

Type of firms	Firms	Volume of direct receipts ^{1/}		
		Rail	Truck	Total
	Number	Tons	Tons	Tons
Fresh fruits and vegetables ^{2/} ---	5	638	13,674	14,312
Meat and meat products-----	4	(^{3/})	5,175	5,175
Dairy and poultry products-----	5	(^{3/})	7,075	7,075
Groceries ^{4/} -----	13	19,836	83,582	103,418
Fluid milk products ^{5/} -----	6	(^{3/})	107,483	107,483
Bakery products-----	4	(^{3/})	---	(^{6/})
Total-----	37	20,474	216,989	237,463

^{1/} Excludes transfers among firms.

^{2/} Includes some frozen food products.

^{3/} No receipt reported.

^{4/} Includes 1 frozen food, 1 tobacco wholesale, and 1 garden supply firm; volume combined to prevent disclosure of individual firm data.

^{5/} Reported in ton equivalents. For details on volume data, see p. 9.

^{6/} Comparable data not collected for bakery firms because of redistribution function of Asheville facilities.

The nine food chains included (1) corporate chainstores served from their warehouse facilities; (2) retailer-owned cooperatives, which are wholesale food facilities owned by the retailers served by the cooperatives; and (3) voluntary group wholesale firms, which are independent and have affiliated with a group of independent retail stores to serve them and advertise for them under a common name. Three national food chains served Asheville from outside the area, primarily from Charlotte, N.C., Atlanta, Ga., and Greenville, S.C. These firms were not included in this study because of the location of their warehouse facilities. Six local food chains operated within the Asheville area, one of which was a large full-line distributor; the others supplied limited-line convenience stores. Detailed information concerning the local chains is not included to avoid revealing confidential data.

Fresh Fruits and Vegetables

Five wholesale fresh fruit and vegetable firms were in the Asheville area. Two of them occupied facilities in old brick structures adjacent to the Lexington Avenue Market. One of these firms operated a produce packinghouse outside the city. Another firm operated facilities in the downtown area near the present retail market. This one-story warehouse permitted indoor loading of vehicles. Two other firms were located outside the downtown area but within the city. One needed immediate renovation.

Only two of the five firms had rail sidings at their facilities. One firm received a limited amount of team track facilities. Most of the firms occupied storefront buildings. If the building had two or three stories, the upper floors were not used to store food products. In some instances this space was used for carton storage.

Most firms could not utilize modern materials-handling equipment because of the age of the facilities, building layout, and congested conditions.

Three of the fresh fruit and vegetable wholesalers rented their facilities and two owned them (table 2). The tonnage handled by the fresh fruit and vegetable wholesalers represented slightly more than 6 percent of the total handled by all types of independent food wholesalers. The floorspace occupied by the fresh fruit and vegetable wholesalers totaled about 26,000 square feet. This represented about 5 percent of the total space occupied by all types of independent food wholesalers. Approximately 59 percent of the total space used by fresh fruit and vegetable wholesalers was rented and was used to handle approximately 69 percent of the total commodity volume. The remaining 41 percent of the wholesale space and 31 percent of the volume were attributed to fresh fruit and vegetable firms owning their facilities.

Meat and Meat Products

There were four meat and meat products firms in Asheville and surrounding areas. They combined wholesaling and processing. In general, processing means changing carcass meats into primal and other wholesale cuts or other prepared meat products. Two firms were located within and two outside the city limits (fig. 8).

All the meat operators owned their facilities (table 2). The tonnage handled by the meat and meat products firms was slightly more than 2 percent of the total handled by all types of independent food wholesalers, excluding the bakery firms. The total floorspace occupied by meat and meat products firms was about 29,000 square feet. This represented about 5 percent of the total space occupied by all types of food wholesalers.

Dairy and Poultry Products

Five wholesalers of dairy and poultry products were in the Asheville area. Four were poultry products firms (fig. 9) and one was a dairy products firm. Two of the poultry firms occupied multistory facilities in the downtown area, one was in a public cold storage warehouse, and one was outside the downtown area. The dairy firm was located near the retail market.

None of these firms received products by rail.

One firm used space above the first floor for product storage and an office.

TABLE 2.--Tenure, space, and volume of wholesale food distribution facilities, Asheville, N.C.

Type of firm	Wholesale firms renting facilities				Wholesale firms owning facilities				Total	
	Firms		Space		Firms		Space		Firms	
	Number	Sq ft	Volume	Tons	Number	Sq ft	Volume	Tons	Number	Space
Fresh fruits and vegetables----	3	15,304	9,937	4,375	2	10,680	4,375	4,375	5	25,984
Meat and meat products----	0	0	0	5,175	4	28,780	5,175	5,175	4	28,780
Dairy and poultry products----	3	11,700	6,460	615	2	10,400	615	615	5	22,100
Groceries----	6	73,400	24,379	79,039	7	190,800	79,039	79,039	13	264,200
Fluid milk products----	0	0	0	107,483	6	188,770	107,483	107,483	6	188,770
Bakery products 1/-----	---	---	---	---	---	---	---	---	2/ 4	2/ 27,460
Total-----	12	100,404	40,776	196,687	21	429,430	196,687	196,687	37	557,294

1/ Comparable data not collected for bakery firms because of redistribution function of Asheville facilities.

2/ Number of firms and space occupied are included in totals but not identified by tenure status.

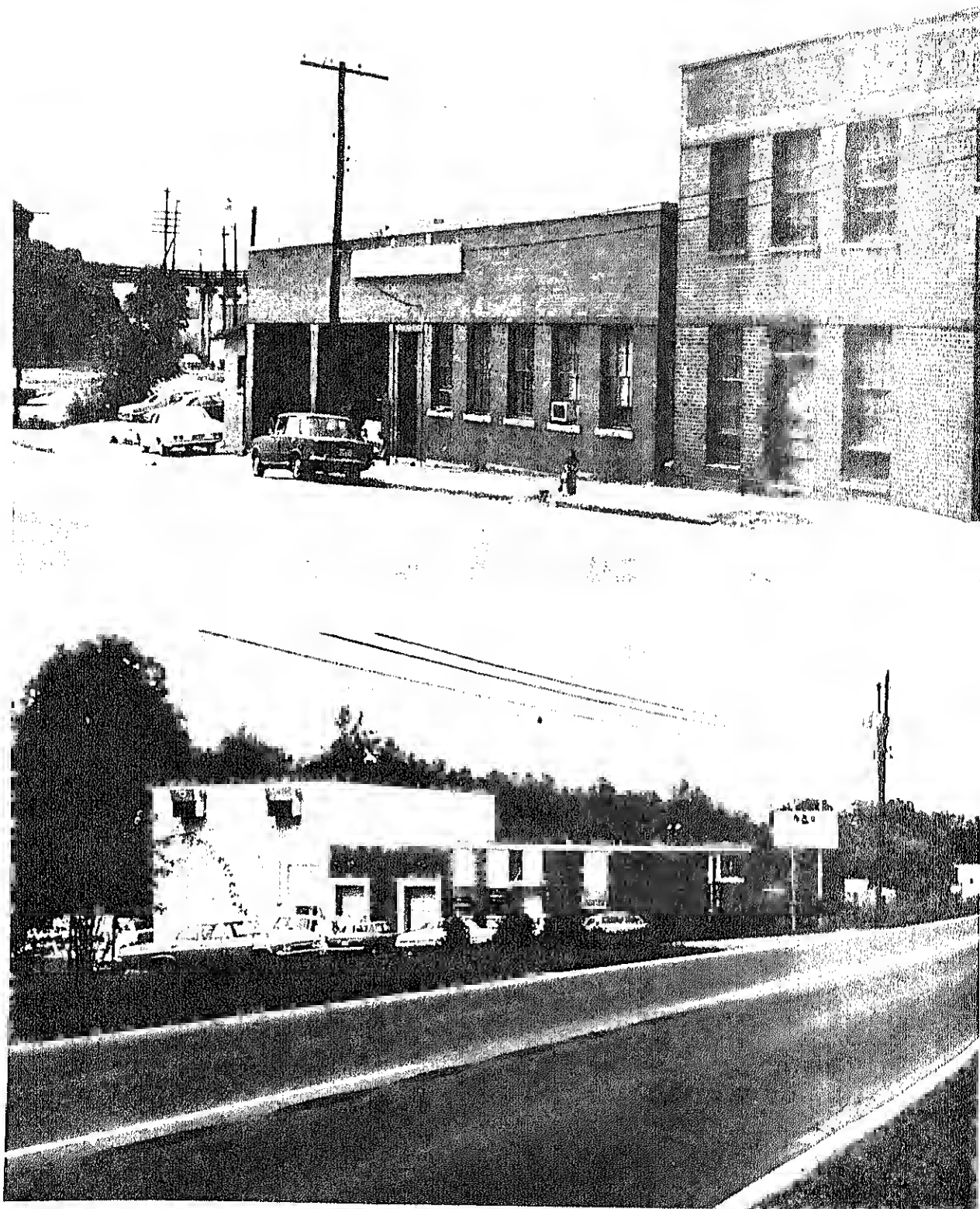
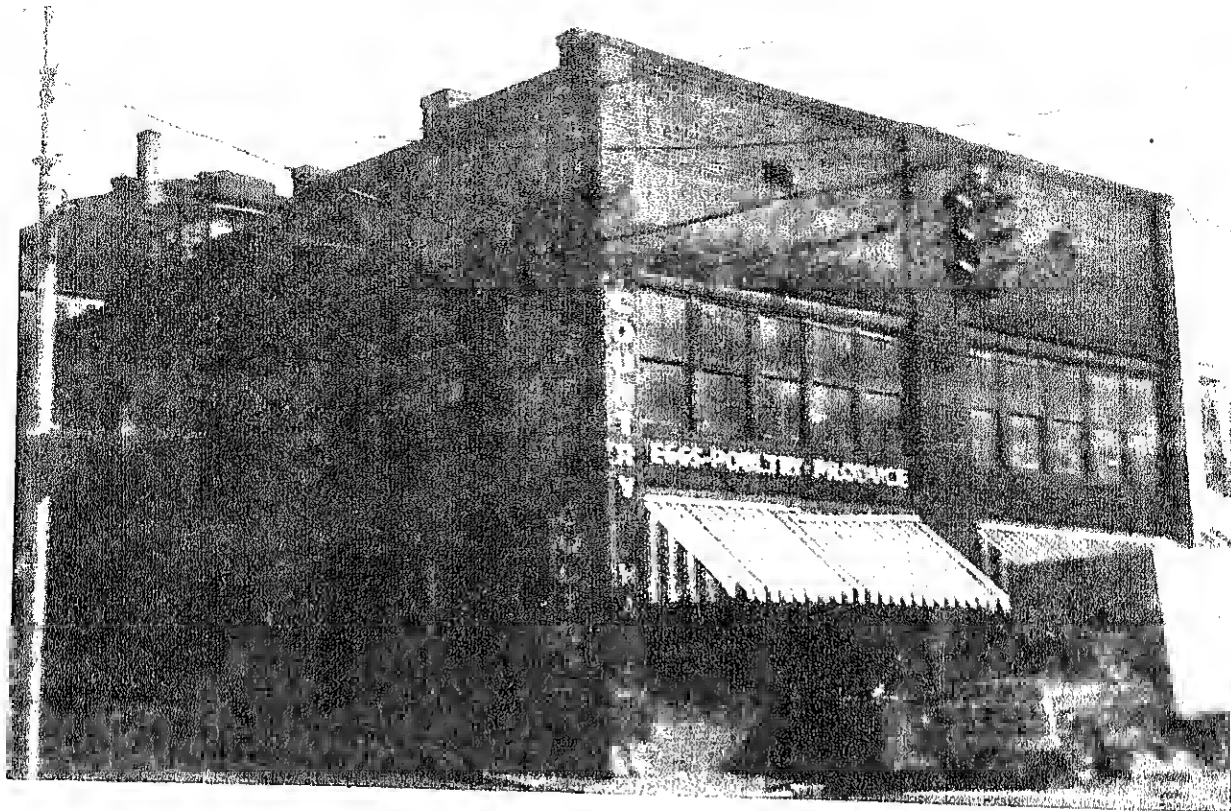


Figure 8.--Wholesale meat facilities: Above, within the city;
below, outside the city.



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Figure 9.--Poultry products facility.

Three of the dairy and poultry products wholesalers rented their facilities and two owned them (table 2). The tonnage handled by the dairy and poultry wholesalers represented about 3 percent of the total handled by all types of independent food wholesalers. The total floorspace occupied was a little more than 22,000 square feet. This represented about 4 percent of the total space occupied by all types of independent food wholesalers. Of the total volume for the dairy and poultry products firms, 91 percent was handled in rented facilities, which comprised, in turn, 53 percent of the total space used by this commodity. The remaining 9 percent of the volume was handled in the 47 percent of the commodity space that was owned by the user.

Groceries

There were 13 wholesale grocery firms in the Asheville area. Eleven of these firms specialized primarily in the institutional, restaurant, and retail trade, one was a full-line distributor, and one was a garden supply firm, included here to prevent disclosure of individual firm data.

Five of the firms received some products by rail at rail sidings either at their facilities or at other locations.

Ten of the grocery firms were in single-story (fig. 10) and only three in multistory facilities (fig. 11). One firm operated from downtown and the others were scattered throughout the area.

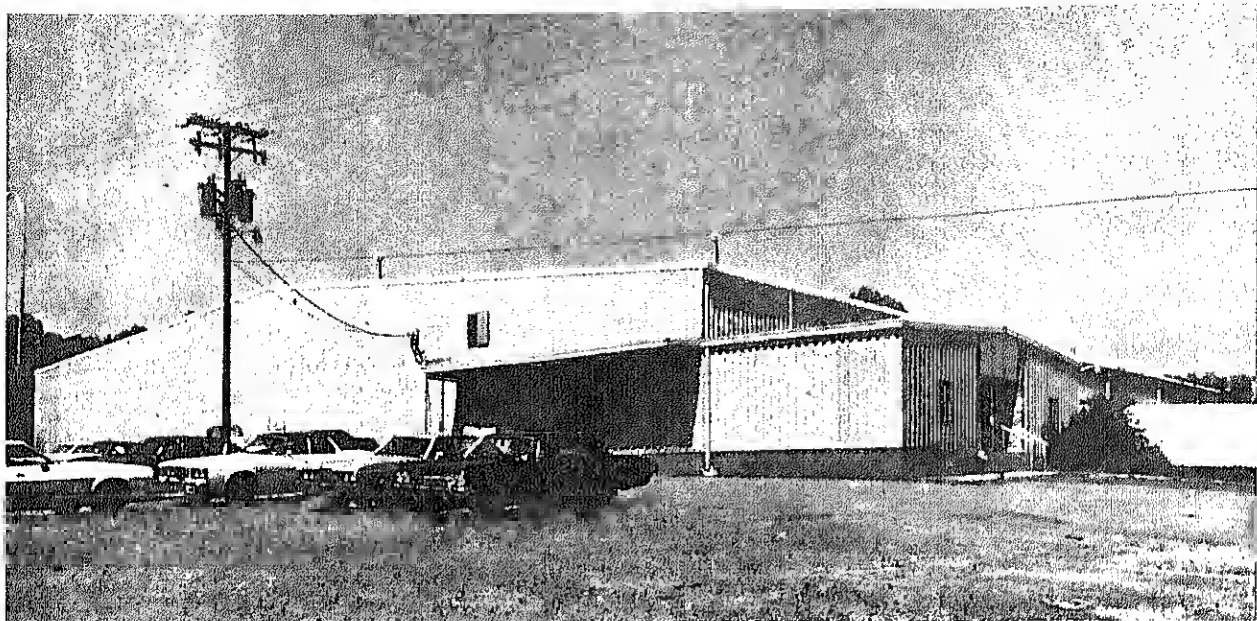


Figure 10.--Single-level grocery facility.

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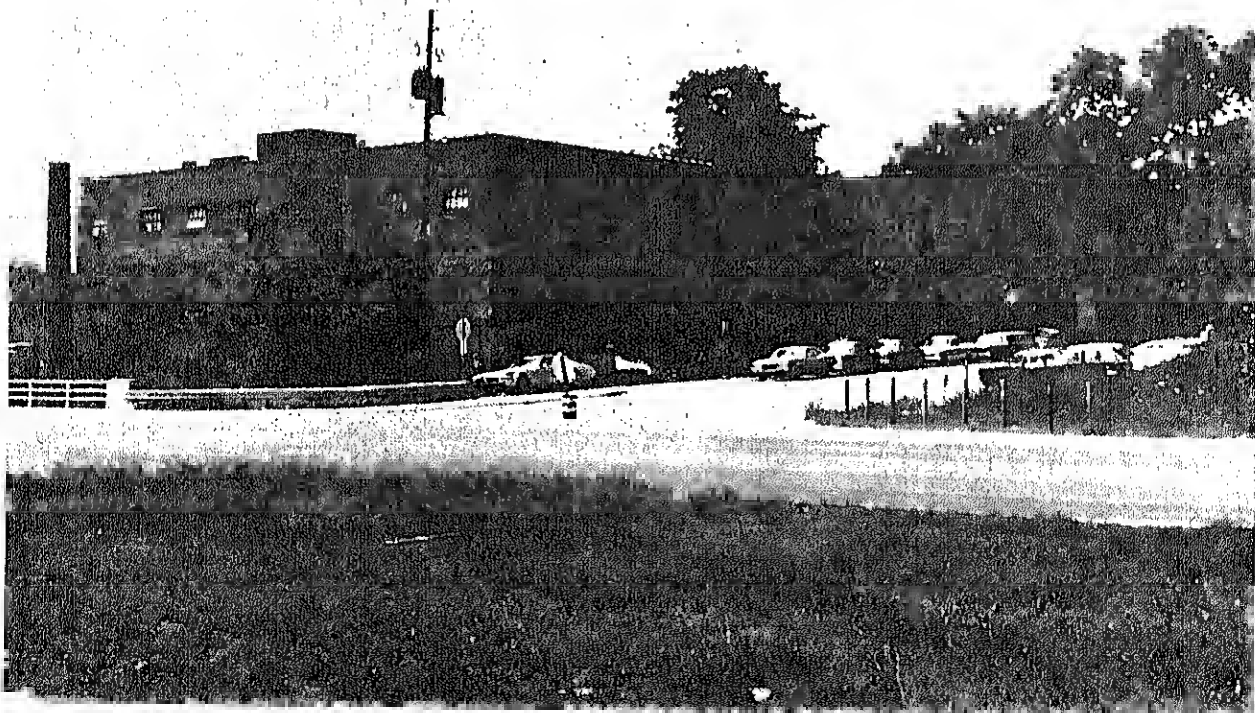


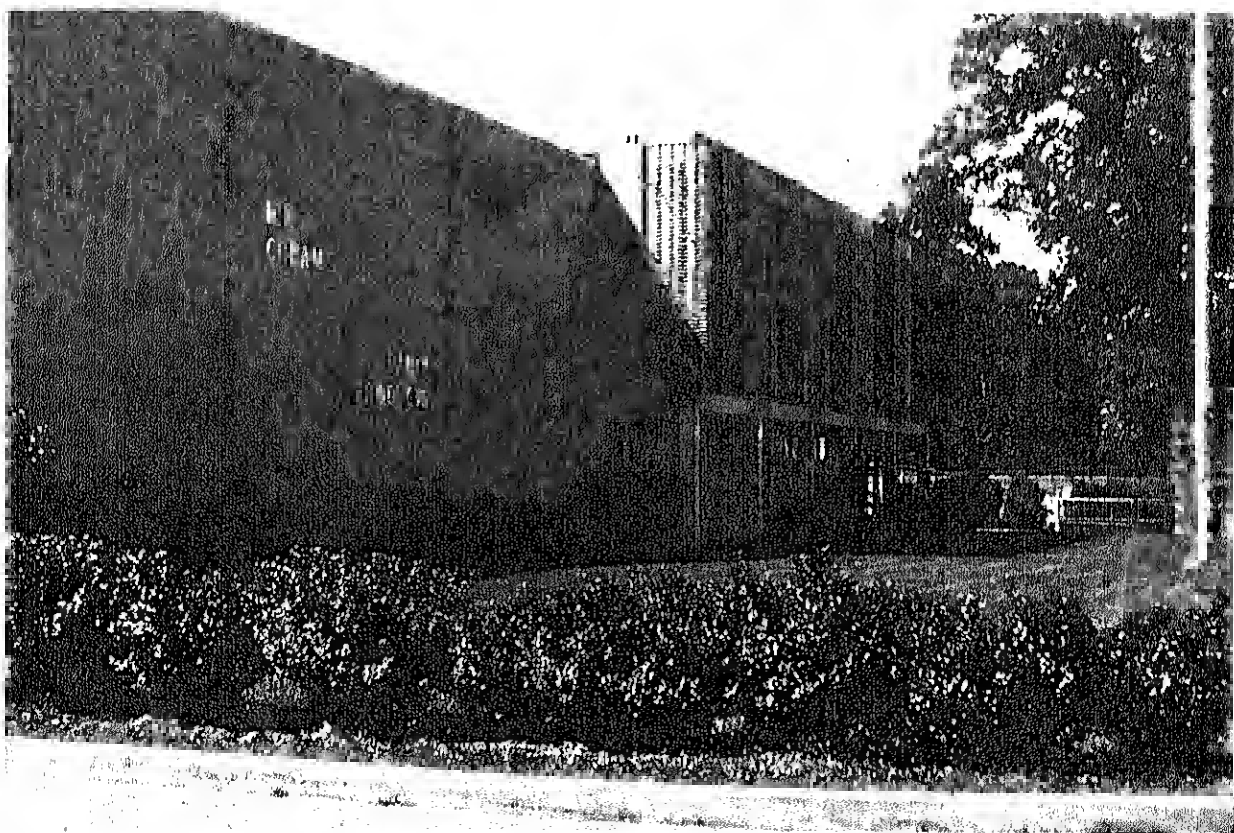
Figure 11.--Multistory grocery facility.

PN-5434

Six of the grocery wholesalers rented their facilities and seven owned them (table 2). The tonnage handled by the grocery wholesalers represented about 44 percent of the total handled by all types of independent food wholesalers. The total floorspace occupied by the grocery wholesalers was about 264,000 square feet or 46 percent of the total space occupied by all types of independent food wholesalers. Approximately 24 percent of the total volume for the grocery firms was handled in the 28 percent of the warehouse space rented by this type of firm. The remaining 76 percent of the volume was handled in the 72 percent of the space owned by the user.

Fluid Milk Products

Three fluid milk processing and three dairy products distributing plants were in the Asheville area (fig. 12). Two of the processing plants had modern facilities located on sites that provided sufficient space for growth. One was in an industrial park and the other occupied land that was a part of a



PN-5435

Figure 12.--Fluid milk plant.

large estate. The third plant was on a dairy farm outside the city. All had separate facilities on the sites, including garages and other buildings used essentially for processing and storage. Two of the firms operated retail dairy stores in conjunction with their processing operations.

Two of the three dairy products distributing plants had modern one-story facilities designed for efficient operation, and the other met present operating requirements. Approximately 188,770 square feet of floorspace were used by the six firms for processing, handling products, or both.

The volume of products either processed or handled by these six firms totaled 21,242,675 gallons of fluid milk, 492,600 gallons of fruit drinks, 3,557,000 gallons of ice cream and soft serve mixes, and 2,943,700 pounds of butter, margarine, eggs, and cheese. Of this total, 84 percent was processed by the firms and 16 percent was received in processed form from outside sources. Less than 1 percent received in processed form came from within the metropolitan area.

Bakery Products

There were four wholesale bakery products firms in the Asheville area. None of these firms had bakery operations in Asheville; their facilities in the city were used as redistribution points. All firms had retail outlets in conjunction with their distribution operation. One firm was near the downtown business district and the others were scattered throughout the city. Only two of the firms had modern facilities. The distribution area for the four firms covered a 75-mile radius.

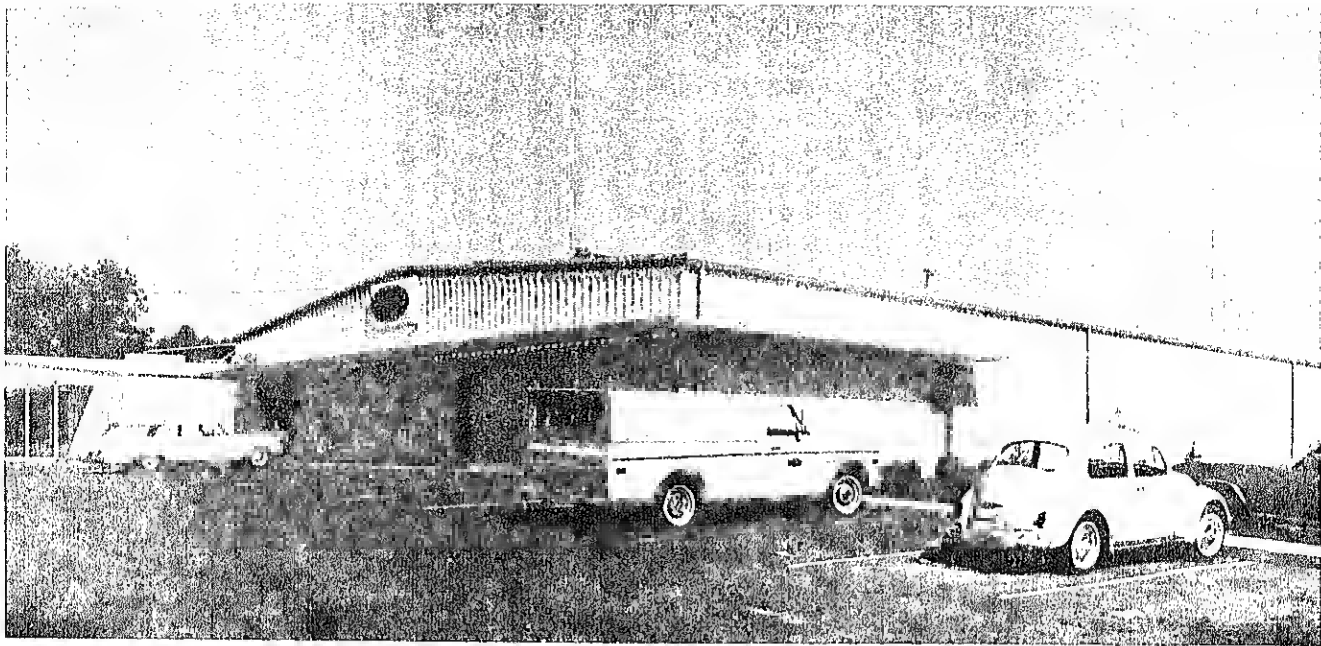
The total floorspace occupied by the bakery products wholesalers was about 27,000 square feet. This represented about 5 percent of the total space occupied by all types of independent food wholesalers.

A wholesale bakery products facility is shown in figure 13.

Source of Supply

The volume of food products handled and the tonnage originating in the Asheville area, outside the area but within the State, and outside the State are shown in table 3.

About 21 percent of the fresh fruit and vegetable volume was reported as originating within the State. Much of the volume received by wholesalers in Asheville was not received direct. Full-line wholesalers in Charlotte and Raleigh supplied wholesalers in Asheville. Only 5 percent of the direct receipts of fruits and vegetables arrived by rail from producing areas. About 79 percent of the total volume handled in the Asheville area was received direct from producing areas outside the State.



PN-5436

Figure 13.--Wholesale bakery products facility.

TABLE 3.--Source of supply by type of firm and geographical area, Asheville, N.C.

Type of firm	Asheville area	Outside Asheville area	Outside State	Total
	<u>Tons</u>	<u>Tons</u>	<u>Tons</u>	<u>Tons</u>
Fresh fruits and vegetables-	186	2,845	11,281	14,312
Meat and meat products-----	---	2,073	3,102	5,175
Dairy and poultry products--	---	4,636	2,439	7,075
Groceries-----	738	12,542	90,138	103,418
Fluid milk products----- <u>1/</u>	106,283	46	1,154	107,483
Bakery products <u>2/</u> -----	---	---	---	---
Total-----	107,207	22,142	108,114	237,463

1/ Includes 105,930 tons of raw product processed locally and 353 tons of finished product from local sources.

2/ Comparable data not collected for bakery firms because of redistribution function of Asheville facilities.

About 40 percent of the meat and meat products were supplied from sources within North Carolina. These products were received from local slaughterers and meat packers or from the Midwest. About 60 percent came from sources outside the State.

About 66 percent of the dairy and poultry products were supplied from within the State. One firm handled cheese exclusively.

Only 13 percent of the products handled by grocery wholesalers originated within the State, with less than 1 percent from the Asheville area. Grocery firms accounted for the second largest percentage of the total volume handled by independent wholesalers and were the heaviest rail receivers in the area, with about 20 percent of incoming receipts by rail. About 87 percent of the groceries were obtained from sources outside the State.

The fluid milk plants received their supply of raw milk for processing from local producers and cooperatives, whereas the dairy distributing plants received most of their finished products from sources outside the Asheville marketing area. All the firms distributed products on both wholesale and retail trucks in the metropolitan area and to consumer outlets within a 100-mile radius of Asheville.

Bakery products were supplied by bakeries in Shelby, Thomasville, and Valdese, N.C., Anderson, S.C., and Johnson City, Tenn., and were redistributed by firms with facilities in Asheville.

Distribution of Food Products

Eighty-seven percent of the volume of all food products was delivered by the wholesalers. The amount varied from 89 percent for fruits and vegetables to 100 percent for fluid milk products, including volume delivered by independent distributors. The amounts delivered by specific wholesalers or picked up by customers are shown in table 4.

Most food wholesalers in the Asheville area distributed their products within a 50- to 75-mile radius of the city. Twenty-seven percent of the total volume of direct receipts was distributed within the Asheville area, 51 percent outside the area but within the State, and 22 percent outside the State to nearby sections of Virginia, Tennessee, Georgia, and South Carolina. The distribution and volume of products are shown in table 5.

Of the total volume distributed, 58 percent was sold to institutions, restaurants, and retailers; 37 percent to full-line distributors; 2 percent to other wholesalers; and 3 percent to other customers (table 6). Only fresh fruit and vegetable and fluid milk products firms sold less than half of their total products to institutions, restaurants, and retailers. Approximately 55 percent of the total fresh fruit and vegetables and 68 percent of the total fluid milk products were sold to full-line distributors.

TABLE 4.--Method of distribution by type of firm, Asheville, N.C.

Type of firm	Delivered by wholesaler	Picked up by customer	Other	Total
	<u>Tons</u>	<u>Tons</u>	<u>Tons</u>	<u>Tons</u>
Fresh fruits and vegetables--	12,747	1,565	---	14,312
Meat and meat products-----	4,955	220	---	5,175
Dairy and poultry products---	6,666	408	<u>1/</u> 1	7,075
Groceries-----	97,237	6,181	---	103,418
Fluid milk products-----	85,251	---	<u>1/</u> 22,232	107,483
Bakery products <u>2/</u> -----	---	---	---	---
Total-----	206,856	8,374	22,233	237,463

1/ Represents volume delivered by independent distributors.

2/ Comparable data not collected for bakery firms because of redistribution function of Asheville facilities.

TABLE 5.--Distribution by type of firm and geographical area, Asheville, N.C.

Type of firm	Asheville area	Outside Asheville area	Outside State	Total
	<u>Tons</u>	<u>Tons</u>	<u>Tons</u>	<u>Tons</u>
Fresh fruits and vegetables--	7,155	6,688	469	14,312
Meat and meat products-----	1,576	3,599	0	5,175
Dairy and poultry products---	3,271	3,011	793	7,075
Groceries-----	21,712	69,826	11,880	103,418
Fluid milk products-----	30,724	37,264	39,495	107,483
Bakery products <u>1/</u> -----	---	---	---	---
Total-----	64,438	120,388	52,637	237,463

1/ Comparable data not collected for bakery firms because of redistribution function of Asheville facilities.

Employment

Independent fresh fruit and vegetable, meat and meat products, dairy and poultry, grocery, and fluid milk firms employed approximately 744 workers in their wholesale and delivery operations (table 7). Of this total, 27 percent were administrative and sales personnel, 13 percent handlers, 25 percent processors, 27 percent truckdrivers, and 8 percent in such other categories as maintenance and security.

TABLE 6.--Distribution by type of firm and customers, Asheville, N.C.

Type of firm	Institutions, restaurants, and retailers	Full-line distributors	Other wholesalers	Other customers	Total
	<u>Tons</u>	<u>Tons</u>	<u>Tons</u>	<u>Tons</u>	<u>Tons</u>
Fresh fruits and vegetables--	4,582	7,917	1,813	---	14,312
Meat and meat products-----	5,063	---	112	---	5,175
Dairy and poultry products---	7,075	---	---	---	7,075
Groceries-----	93,930	7,823	1,665	---	103,418
Fluid milk products-----	27,384	72,770	---	1/ 7,329	107,483
Bakery products 2/-----	---	---	---	---	---
Total-----	138,034	88,510	3,590	7,329	237,463

1/ Represents volume of home delivery.

2/ Comparable data not collected for bakery firms because of redistribution function of Asheville facilities.

TABLE 7.--Number and classification of employees by type of firm, Asheville, N.C.

Type of firm	Administrative and sales	Handlers	Processors	Truckdrivers	Others	Total
	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>
Fresh fruits and vegetables--	8	9	4	14	---	35
Meat and meat products-----	10	---	---	---	47	57
Dairy and poultry products---	8	10	16	2	3	39
Groceries-----	85	81	---	69	---	235
Fluid milk products-----	91	---	163	113	11	378
Bakery products 1/-----	---	---	---	---	---	---
Total-----	202	100	183	198	61	744

1/ Comparable data not collected for bakery firms because of redistribution function of Asheville facilities.

IMPROVING MARKETING FACILITIES

Food wholesalers in Asheville are scattered throughout the city. Many firms are housed in old buildings intended for other uses. This type of building results in inefficient operations.

Firms located in multistory buildings must use slow freight elevators to move merchandise to upper floors. This double handling of product adds to the cost of distributing food. Some buildings constructed on grade have no platforms for loading and unloading and cannot accommodate modern materials-handling equipment.

Since most firms do not have rail connections at their facilities, any rail receipts must be moved from team tracks. At times, unloading operations block pedestrian traffic or customer access to buildings. Some of the downtown firms lack adequate parking for employees, salesmen, and customers.

Several food firms in Asheville have realized the expense of operating in inefficient buildings and have moved into new facilities.

Any proposed improvements should provide for the existing marketing facilities that need to be rebuilt. One way to meet this need would be to construct a new farmers' market and other facilities for a wholesale food distribution center in Asheville. A plan for such a development is shown in figure 14. Building space is included for wholesle food firms, farmers, and dealers who operate in the Lexington Avenue and Riverside Markets. The entire development would require approximately 30 acres, including 8½ acres for expanding the farmers' market and for developing allied food industries and wholesale firms.

The plan for the proposed facilities has been designed to eliminate the major physical problems that exist in the wholesale marketing of food in Asheville. It provides for (1) ample building space for all firms needing new facilities; (2) wide streets for free flow of traffic into, within, and out of the market area; (3) ample parking space and adequate areas for receiving and shipping operations at minimum cost; (4) proper facilities for the efficient handling of local farm produce and other food products distributed in the area; (5) rail tracks directly to major rail receivers to prevent double handling and carting of rail receipts; and (6) space for expanding the initial facilities and for constructing new facilities for firms needing to relocate in the future.

The overall plan for the center provides for a farmers' market, a farmers' market-related section, and a wholesale market (table 8). This plan offers the following advantages:

(1) It combines present split operations of the Lexington Avenue and Riverside Markets to create a stronger central farmers' market.

(2) It can be implemented in stages according to the types of operation performed.



PN-5437

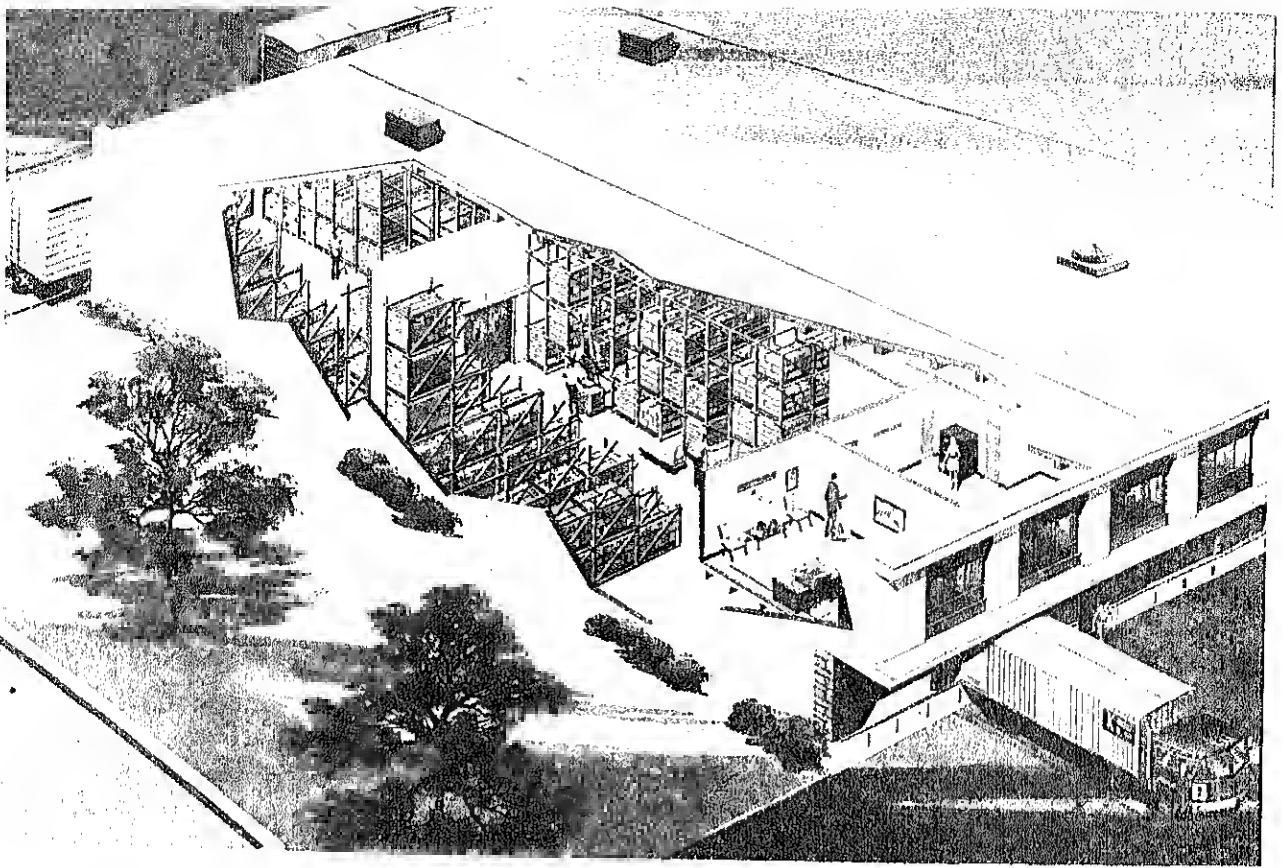
Figure 14.--Artist's conception of the wholesale food distribution center for Asheville, N.C.

- (3) Buyers can shop in designated wholesale or retail areas.
- (4) Farmers, wholesalers, and retailers can work more closely on matters of common interest.
- (5) Nonmarket automobile and truck traffic can be eliminated.
- (6) Expansion potential for wholesalers and others located in the new development will be improved.
- (7) The efficiency of product transfers between wholesalers and retailers can be improved.

Single-occupancy and multiple-occupancy buildings are proposed for the center. The single-occupancy building is designed to meet the needs of only one firm and the multiple-occupancy building (fig. 15) for more than one firm. The latter has units, 30 feet wide by 100 feet deep, which can be separated by removable, floor-to-ceiling, waterproof partitions. The total length of the building can vary depending on the number of units. A wholesaler can use any number of units he needs. Wholesalers handling similar types of commodities, such as fruits and vegetables, should be grouped together in a building

TABLE 8.--Proposed buildings and space recommendations for improved farmers' market and
wholesale food distribution facilities, Asheville, N.C.

Type of facility	Multiple occupancy		Single occupancy		Total proposed floorspace
	Buildings	Units	Buildings	Floorspace	
	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Sq ft</u>	<u>Sq ft</u>
Farmers' market-----	2	---	---	---	23,520
Farmers' market-related section-----	---	---	2	13,600	13,600
Wholesale market-----	2	11	3	41,000	74,000
Total-----	4	11	5	54,600	111,120



PN-5438

Figure 15.--Artist's conception of the multiple-occupancy building.

so that the space may be designed to fit the needs of each group. Each unit is accessible through large doorways at both the front and rear. The ceiling should be at least 21 feet high to allow for the palletized stacking of products.

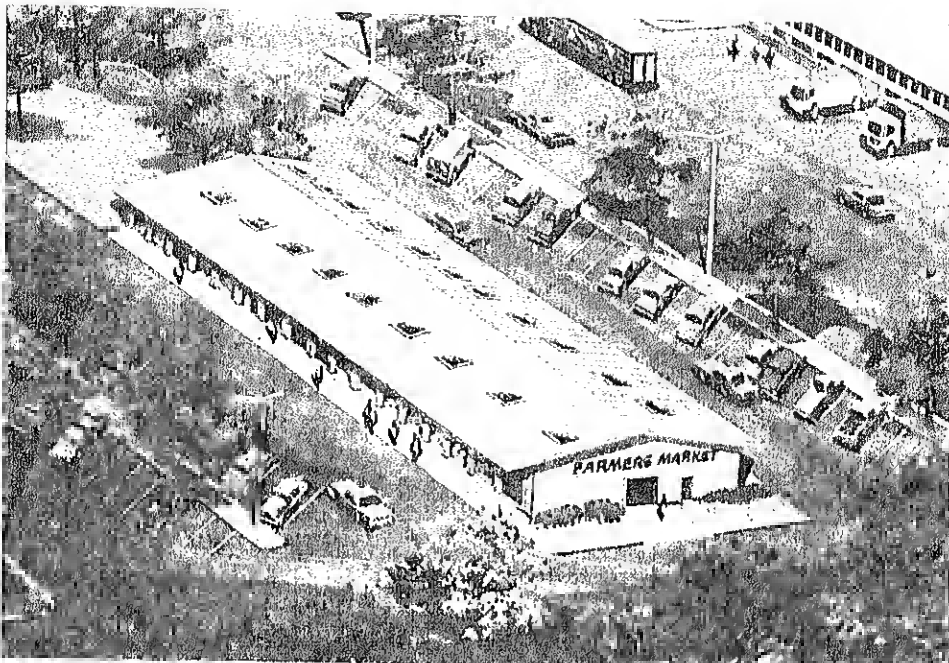
Farmers' Market

The farmers' market includes a retail market building and a truck shed.

Retail Market Building

A low-profile, preengineered steel structure is recommended for the retail market building (fig. 16) to meet the needs of dealers who operate retail stalls in the Lexington Avenue and Riverside Markets. Initially the enclosed space should be 60 by 200 feet. A 12-foot eave height is suggested. The building can be attractively finished in acrylic-enamel preengineered steel.

The retail facility should be erected on a 5-inch reinforced concrete slab at curb height, above grade, and surrounded by an 8-foot-wide sidewalk.



PN-5439

Figure 16.--Artist's conception of the retail market building.

Walk-in doors are provided at the ends of the building and about midway on each side. In addition, a 10- by 12-foot drive-in door at both ends is suggested to facilitate the delivery or removal of heavy objects when necessary.

The interior could be divided into three open areas, each 20 feet wide, extending the length of the building. The center area would serve as the access aisle to the sales stalls of produce vendors and could also be used for the display and sale of handicrafts and similar objects. Each of the other two areas would then be divided into ten 20-foot bays extending the width of the building. Use of such standard, modular components would contribute to efficiency and economy in both the initial construction and the contemplated subsequent expansion. One of the 20-foot bays would be for restrooms and other auxiliary needs. Each of the 9 remaining bays would be divided into four 10- by 20-foot stalls, or a total of 36 stalls, for rent to vendors.

This recommended layout would provide the flexibility to accommodate smaller dealers who might need only one stall, as well as larger vendors who might want three, five, or some other odd number of stalls.

Whether or not the retail building should be designed with rollup doors along each side involves some complex and sometimes conflicting considerations. The following are advantages of such an arrangement:

- (1) It permits display and sale to customers on the sidewalk outside as well as to those in the aisle on the inside.

(2) It facilitates delivery of new stock to the vendor stalls each day as well as removal of trimmings, culls, used packaging materials, and similar disposal items.

(3) It expedites turnover to the extent that customers can actually make a "drive-in" purchase at the stall of their regular suppliers with a brief stop at the curb.

(4) In suitable weather it brings an open-air atmosphere to the retail market.

Among the disadvantages are--

(1) The additional cost--about one-third more for the basic building, including 4- to 6-foot canopies along both sides for the full length of the building.

(2) The inability then to insulate the sidewalls.

(3) The difficulty of heating the building because of air leakage under and around the rollup doors.

(4) The security problem involved in checking out through so many additional doors.

(5) The maintenance burden of keeping the doors in proper working order.

(6) The potential disagreement and discord that is likely to arise among vendors when some want their doors open, causing discomfort to others from cold drafts through the building.

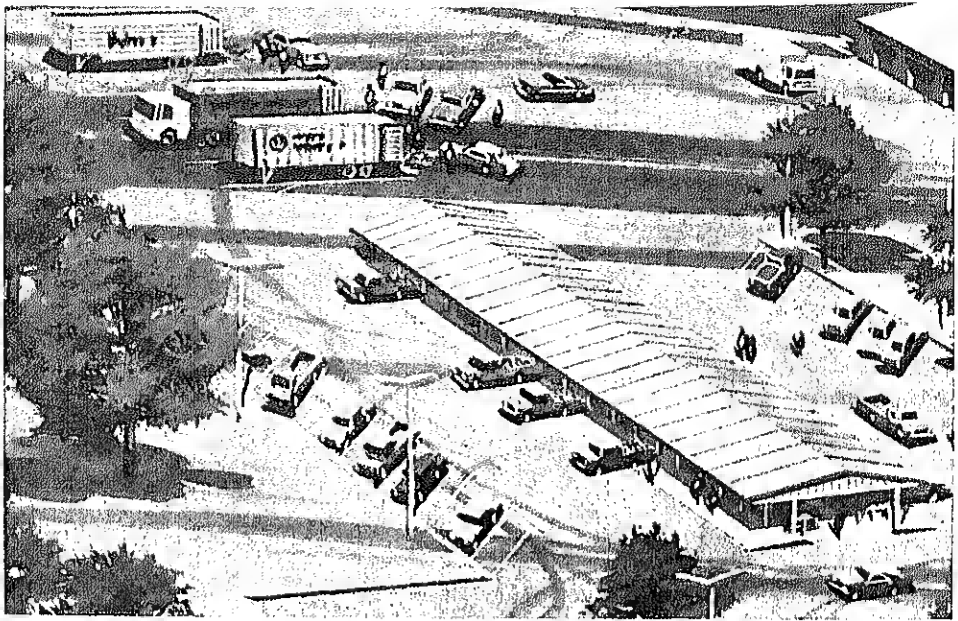
These advantages and disadvantages of rollup doors should be thoroughly discussed with the prospective vendors before deciding on the building design.

Truck Shed

A truck shed for farmers, 48 by 240 feet, provides a roof-sheltered area of 11,520 square feet (fig. 17). It has 10 modular bays, one of which should be enclosed for restrooms, equipment storage, and other auxiliary needs. Each of the 9 remaining bays contains 4 sales spaces or stalls, totaling 36 rental units under cover.

Trucks would be docked on both sides in 12-foot-wide marked-off stalls and would be backed in as far as the line of supporting columns. Behind each vehicle an 8-foot-deep display space is provided. An 8-foot center aisle extends the length of the building (fig. 18).

When the shed is in operation, growers and merchant truckers would position their vehicles in the stalls and set up displays facing the aisle. Most of their produce could be left on the truck as reserve stock and only a small quantity used as samples.



PN-5440

Figure 17.--Artist's conception of the truck shed.

For this facility, a customer-designed, preengineered steel building is recommended, utilizing a continuous beam, which spans the 24 feet between columns, and cantilevers 12 feet beyond the centers of the columns on each side of the building.

The truck shed should be erected on grade rather than on a platform, even one as low as curb height. An on-grade level prevents the hazard to customers gaining access to a platform, permits the use of motorized equipment to run sweepers through the shed, and provides flexibility for temporary or permanent alternate use of the shed. It should be built on a 5-inch reinforced concrete slab, which slopes slightly downward from the centerline to facilitate drainage when it is hosed down.

Farmers' Market-Related Section

The farmers' market-related section includes a garden supply center building and a nutrition center building.

Garden Supply Center Building

A specialized building has been provided in the plan for a single garden supply firm needing new facilities. This building is 100 by 100 feet (fig. 1). An expansion area of 10,000 square feet is reserved adjacent to the facility and might be used to display plants and garden items. This outdoor area could be fenced off if desired. A low-profile, preengineered steel building is

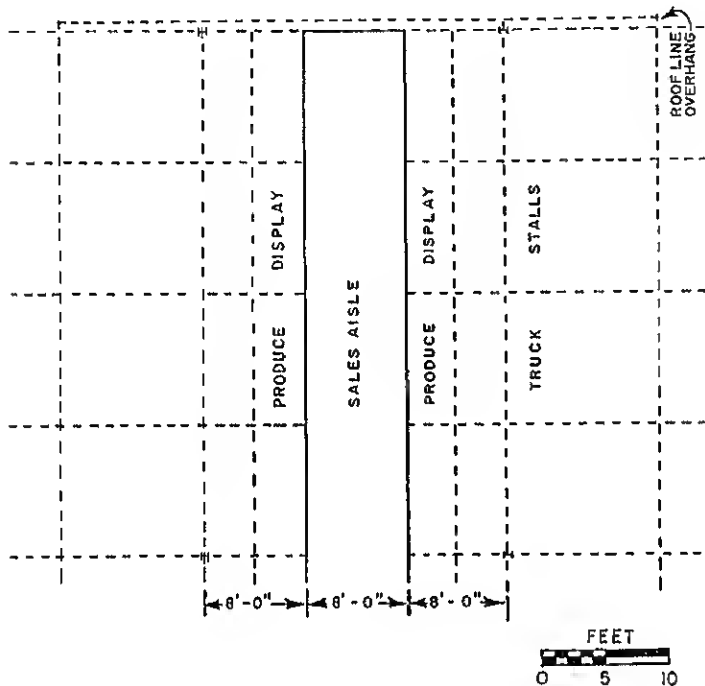
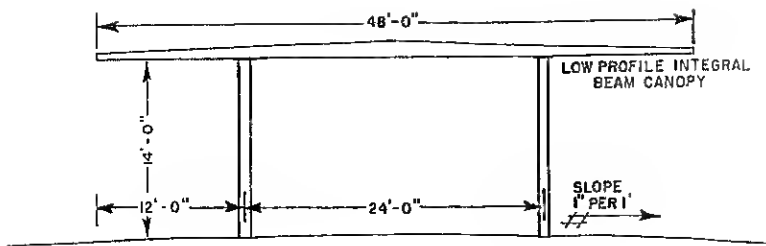
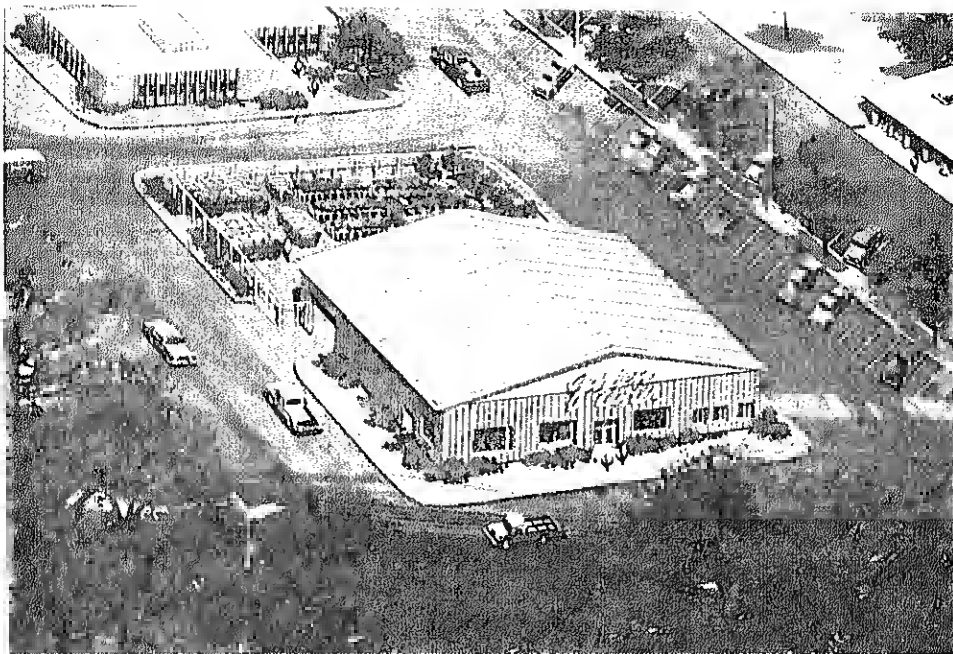


Figure 18.--Plan and section view of the truck shed.

suggested. Ceilings should be at least 21 feet high. The floor should be at truck-bed height, 45 inches above the street. If refrigerated rooms are planned, the floors should be insulated during initial construction.

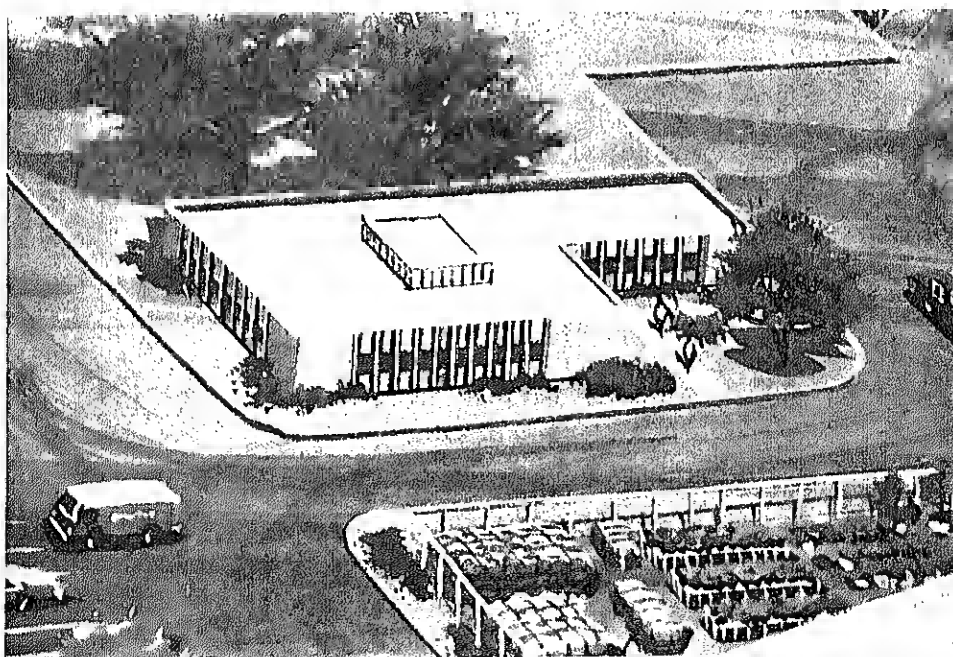
Nutrition Center Building

Many families in the Asheville area and surrounding counties do a substantial amount of home canning. With the growing concern about nutritional needs and rising food costs, a 3,500-square-foot nutrition center building has been incorporated in the plan (figs. 20 and 21). Such a facility is recommended provided it has the grassroots support of the people who will use it.



PN-5441

Figure 19.--Artist's conception of the garden supply center building.



PN-5442

Figure 20.--Artist's conception of the nutrition center building.

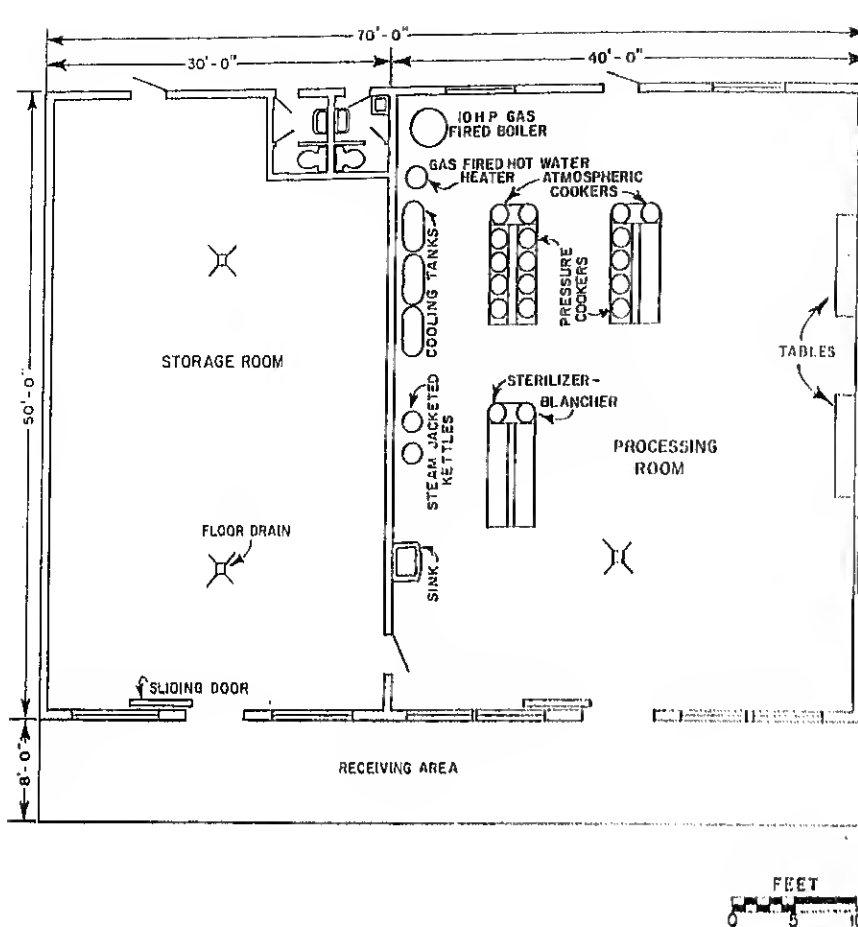


Figure 21.--Layout of the nutrition center building.

Wholesale Market

The wholesale market includes a fruit and vegetable wholesale multiple-occupancy building, dairy and poultry products wholesale multiple-occupancy building, tobacco products warehouse, grocery warehouse, and bakery products wholesale building.

Fruit and Vegetable Wholesale Multiple-Occupancy Building

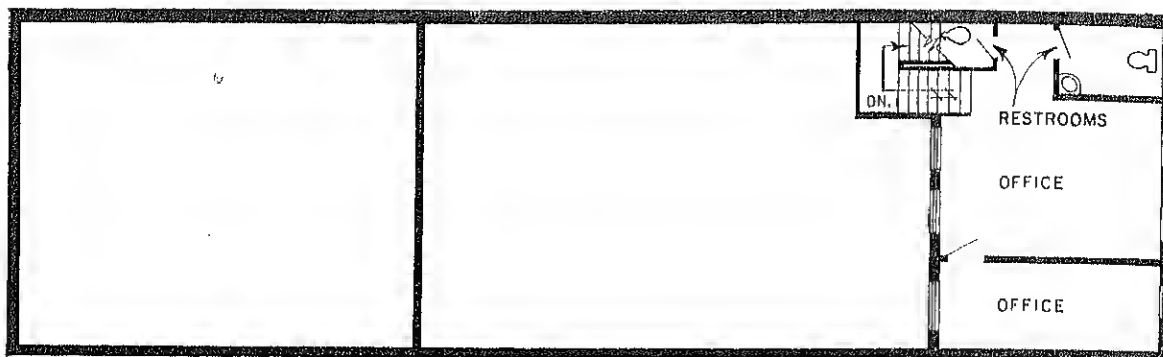
One wholesale fruit and vegetable multiple-occupancy building would be required for five firms needing new facilities. This building is 100 by 180 feet, with 18,000 square feet of enclosed first-floor space (fig. 22).



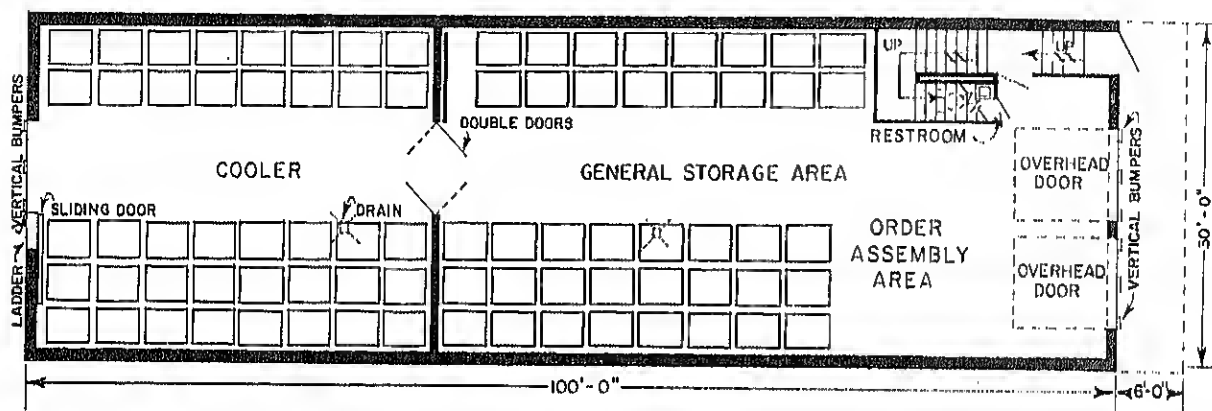
PN-5443

Figure 22.--Artist's conception of the fruit and vegetable wholesale multiple-occupancy building.

Each unit in the building is 30 feet wide and 100 feet deep, including enclosed front and rear loading and unloading areas. Figure 23 illustrates how a single unit might be arranged to meet the needs of a wholesale fruit and vegetable firm. The height of the ceiling in each unit should be at least 21 feet. The front of the unit has two 8- by 8-foot doorways 45 inches above the pavement at truck-bed height. Overhead doors are installed in these doorways. Doors should be provided at street level to allow pedestrian access to stairs leading to the first floor.



MEZZANINE PLAN



FIRST FLOOR PLAN

Figure 23.--Layout of unit in the fruit and vegetable wholesale multiple-occupancy building.

The mezzanine, which is over the truck-loading area at the front of the units, provides 600 square feet of space for offices and light storage. The cooler, general storage area, and order assembly area are arranged in relation to each other to promote an efficient flow of product into, through, and out of the facility.

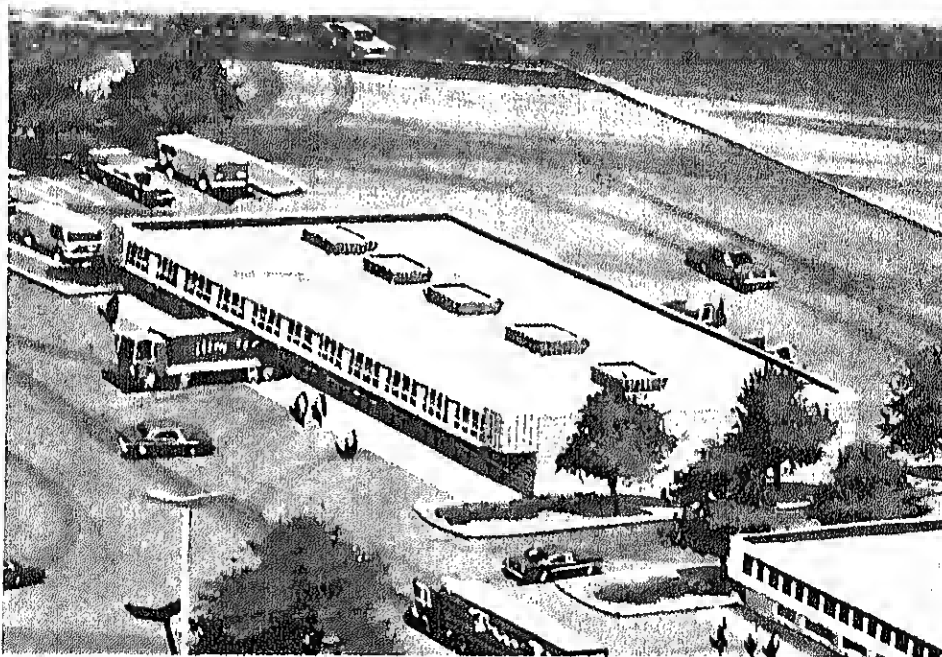
The rear of each unit has a single doorway 45 inches above the pavement at truck-bed height. An 8- by 8-foot sliding, insulated door is installed in this doorway. A ladder recessed into the wall provides pedestrian access to the doorway.

Bumper strips should be attached to both the front and the rear of the building to prevent damage by trucks. Door seals should be provided at the rear cooler doors for use during loading and unloading operations.

The number and kinds of refrigerated rooms to be provided depend on the needs of the individual firms. However, the locations of these rooms should be determined before the building is constructed to avoid unnecessary costs. For example, if freezers for frozen food handling are planned, the floor should be constructed with insulation to prevent frost heaving. Refrigeration equipment could be placed on the roof.

Dairy and Poultry Products Wholesale Multiple-Occupancy Building

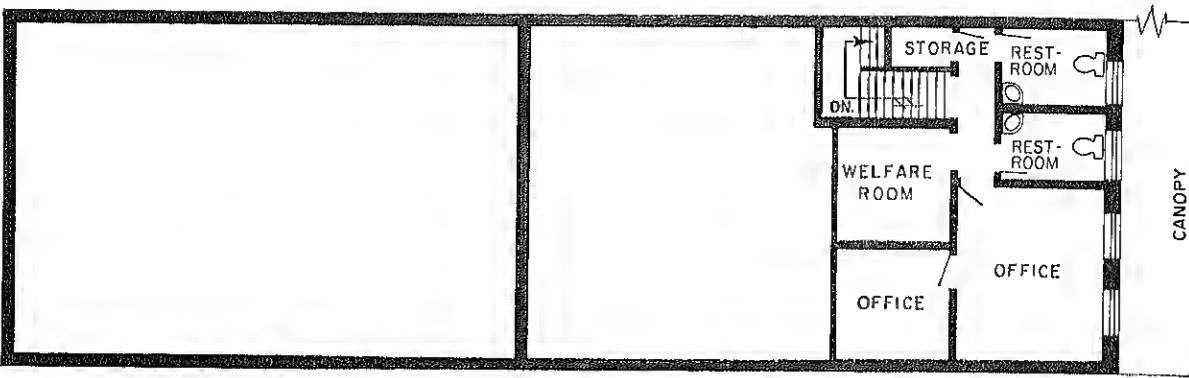
One dairy and poultry products multiple-occupancy building with five units would be required for dairy and poultry wholesalers who need new facilities. This building is 100 by 150 feet, with 15,000 square feet of enclosed first-floor space (fig. 24).



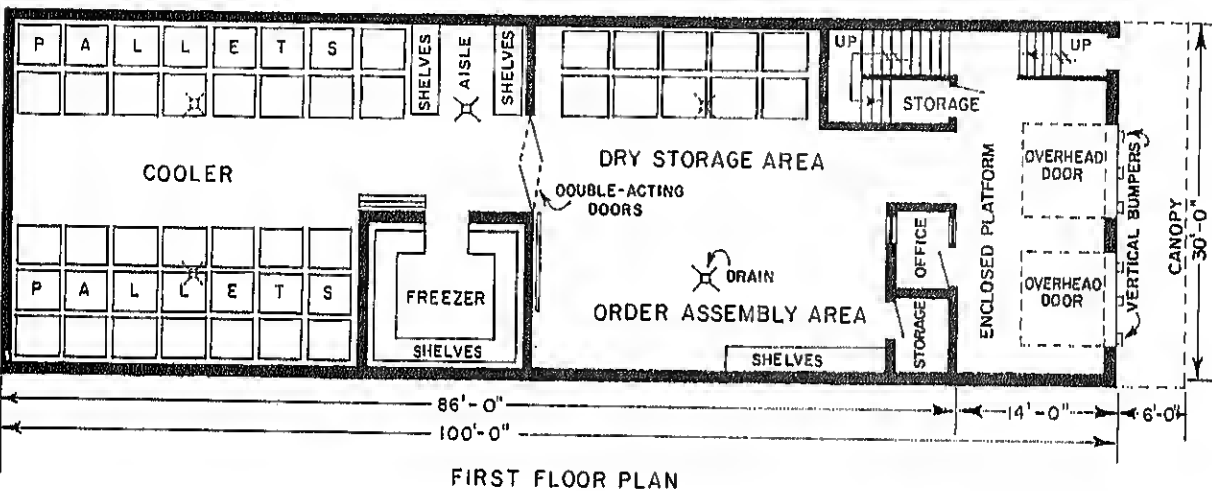
PN-5444

Figure 24.--Artist's conception of the dairy and poultry products wholesale multiple-occupancy building.

Each unit in this building would be 30 feet wide and 100 feet deep and completely enclosed. A unit would contain 3,000 square feet of first-floor and 600 square feet of mezzanine space. Figures 25 and 26 illustrate typical



MEZZANINE PLAN



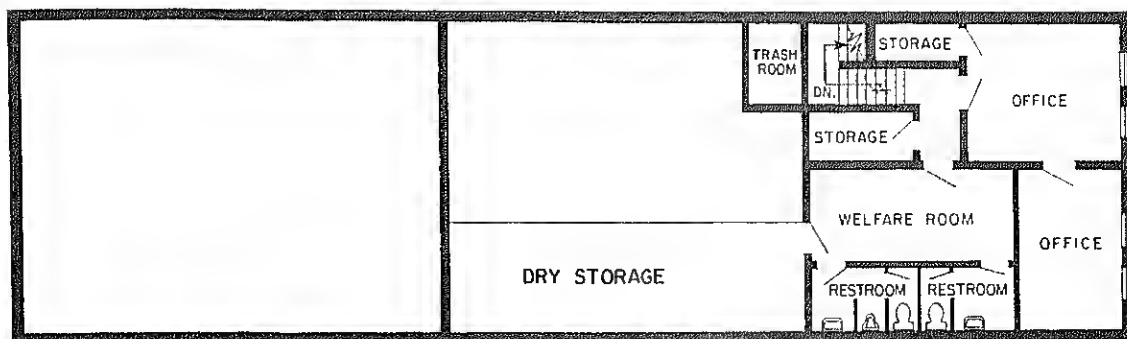
FIRST FLOOR PLAN

Figure 25.--Layout of unit for a dairy firm in the dairy and poultry products wholesale multiple-occupancy building.

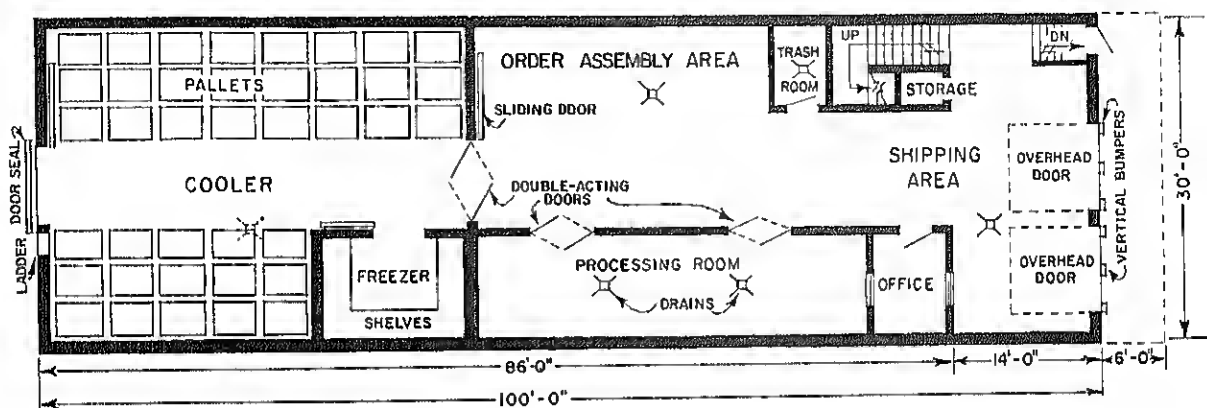
layouts of units for dairy and poultry firms. These layouts do not represent the particular requirements of specific firms in this study and are included solely for illustrative purposes.

The mezzanine provides space for offices, a welfare room, and restrooms.

Clear stacking heights in the poultry coolers are only 12 feet. A one-pallet-high storage area is recommended to avoid contaminating products, which might otherwise result from overhead storage drippage. All floors and loading and unloading areas are 45 inches above the ground at truck-bed height.



MEZZANINE PLAN



FIRST FLOOR PLAN

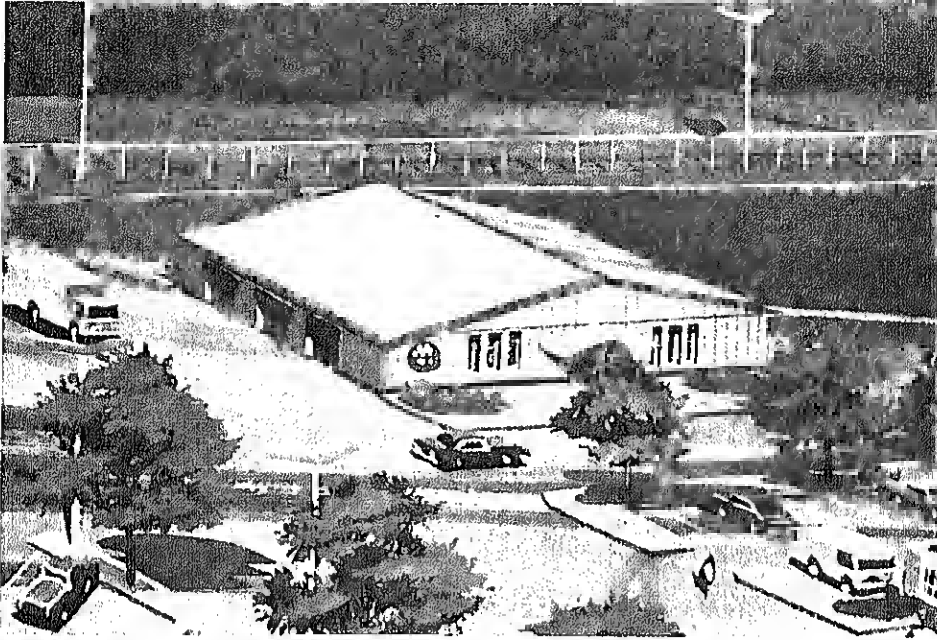
Figure 26.--Layout of unit for a poultry firm in the dairy and poultry products wholesale multiple-occupancy building.

Both dairy and poultry facilities require certain specialized features. The wall surfaces in coolers must be impervious to water to a height of 6 feet above the floor. The wall surfaces above 6 feet and the ceiling must be smooth finished with a moisture-resistant material. All floor drains should be vented and have deep seal traps. Grease traps are necessary in the poultry units. Restroom soil lines should be separated from the floor drainage system to a point outside the building. Details of the poultry facility must comply with U.S. Department of Agriculture regulations for the inspection of poultry and poultry products. ^{5/}

^{5/} For sanitary meat inspection requirements for a facility to be granted USDA approval to store and handle federally inspected meat, refer to "U.S. Inspected Meatpacking Plants, a Guide to Construction Equipment, Layout," U.S. Dept. Agr. Agr. Handb. 191, 73 pp. (1972).

Tobacco Products Warehouse

One tobacco products warehouse has been provided in the plan to house a single wholesaler needing new facilities. It contains 7,000 square feet of enclosed first-floor space and is 70 feet wide by 100 feet long (fig. 27).



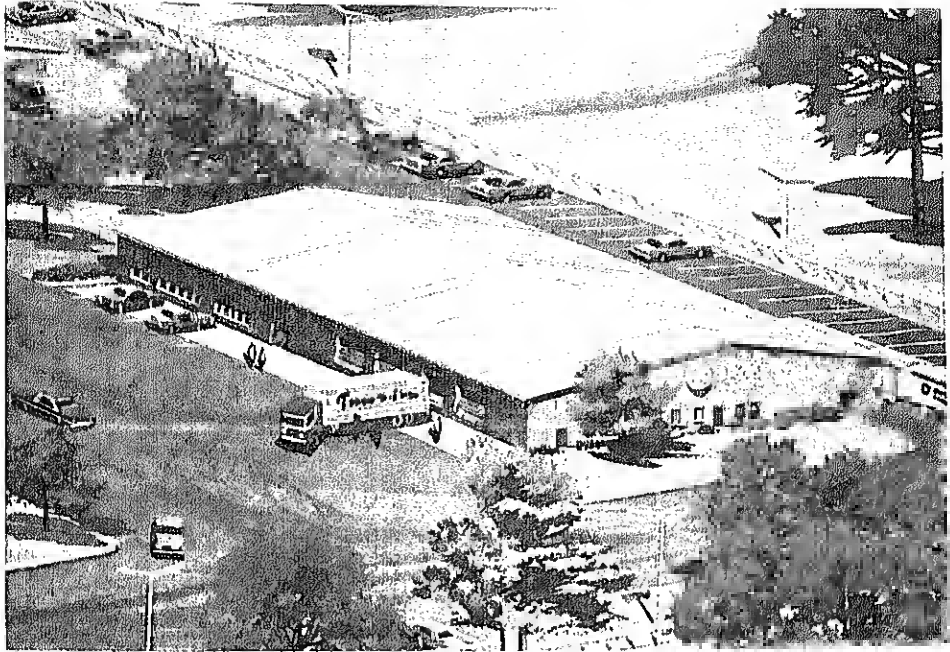
PN-5445

Figure 27.--Artist's conception of the tobacco products warehouse.

Since the tobacco products operations consist primarily of receiving non-refrigerated products at the warehouse, storing them for short periods, and then delivering them to customers, no refrigeration facilities are planned. Six 8- by 8-foot doorways with overhead doors are provided at both the front and rear of the warehouse. Pedestrian access doors are at street level. A preengineered steel building is suggested.

Grocery Warehouse

A grocery warehouse has been provided in the plan for one firm. It is 40 by 140 feet and encloses 19,600 square feet of first-floor space (fig. 28). This warehouse would include coolers and freezers for handling produce and frozen foods in addition to a large selection of grocery products.



PN-5446

Figure 28.--Artist's conception of the grocery warehouse.

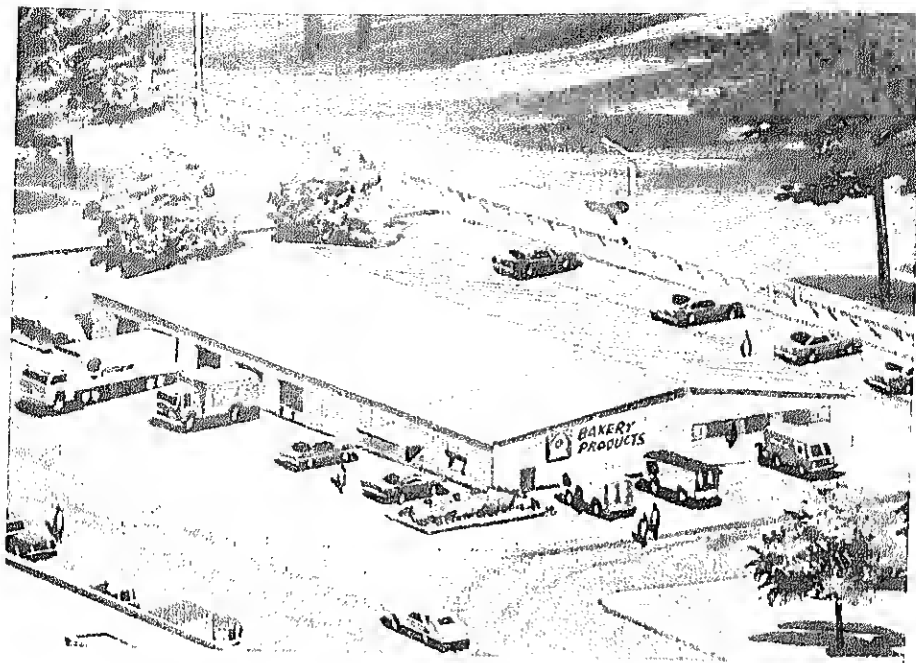
Trucks could be loaded and unloaded at the front or rear of the building. The front of the warehouse has four 8- by 8-foot doorways, 45 inches above the pavement at truck-bed height, with overhead doors. Pedestrian access doors are at street level. This warehouse has been provided with rail service.

There are four doorways at the rear of the warehouse. Each doorway has an 8- by 8-foot sliding door to accommodate receipts by rail. Ceilings should be at least 21 feet high. A preengineered steel building is suggested.

Bakery Products Wholesale Building

The bakery products wholesale building is 120 by 120 feet, with 14,400 square feet of enclosed first-floor space (fig. 29).

The bakery products operation is primarily a 'rack-jobbing' one. After the product is received from the main bakery, it is delivered by the wholesaler to his customers. The shelves or racks of the retailers' stores are filled daily by the wholesaler. Delivery trucks would load at doorways, 45 inches above the pavement, at the front and side of the building. Overhead doors, 8 by 8 feet, are installed in these doorways. Pedestrian access doors are at street level. Ceilings should be at least 21 feet high. A prefabricated steel building is suggested.



PN-5447

Figure 29.--Artist's conception of the bakery products wholesale building.

Auxiliary Facilities and Considerations

Several auxiliary facilities are needed for a new wholesale food distribution center to function properly. They include a gatehouse, streets, docking and maneuvering areas, tractor-trailer parking, and direct rail access.

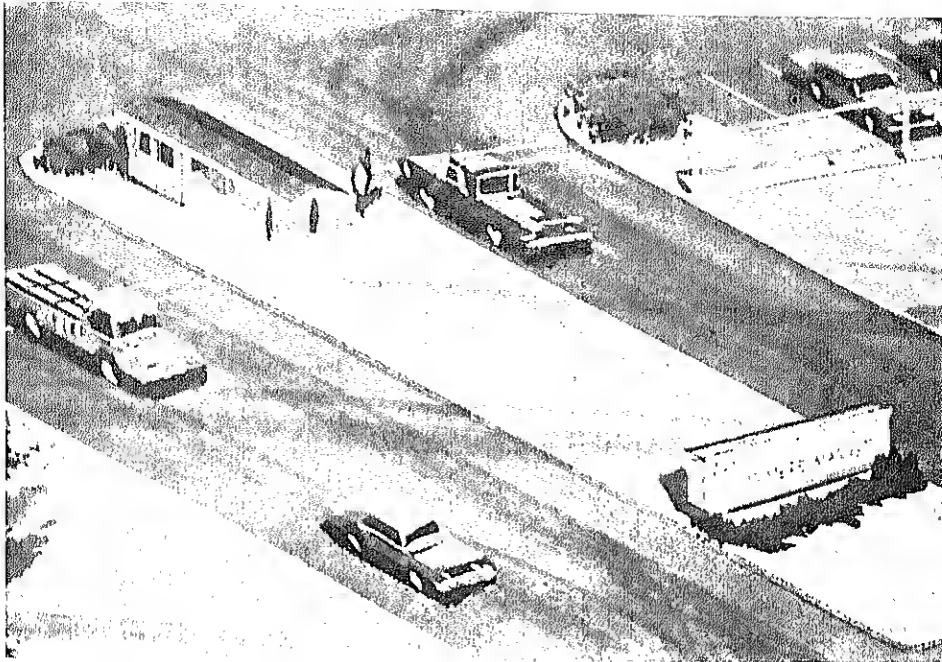
Gatehouse

The plan for the distribution center provides for a gatehouse with double-lane entrance (fig. 30). This permits vehicles that are not required to pay an entrance fee to enter the market without waiting, whereas vehicles subject to an entrance fee would enter in the left lane adjacent to the gatehouse to pay the fee.

Initially a gatehouse may not be necessary. Seasonal rent could be charged for the covered truck shed. Payments by growers who rent uncovered space could be collected by a specified grower on a daily or weekly basis, much like the procedure used at the present markets. A full-time gatekeeper could be hired when the center becomes more fully developed.

Streets

Streets throughout the proposed facility should be paved to carry heavy traffic. Asphaltic concrete paving, with a surface or wearing course 2 inches



PN-5448

Figure 30.--Artist's conception of the food distribution center gatehouse and entrance.

thick, is suggested for areas with moving traffic. Concrete paving, 6 inches thick, is suggested for docking areas, where oil or gasoline drippings would normally soften or dissolve asphaltic concrete.

A 200-foot width is recommended between most facing buildings to allow space for large tractor-trailers to maneuver and park perpendicular to the buildings. Cross streets at least 50 feet wide should be provided to facilitate direct access to various sections of the center.

Drainage should be away from the buildings to street drains.

Docking and Maneuvering Areas

The average over-the-road truck is getting longer each year. All States permit the combined length of tractors and trailers to be at least 55 feet. Most Western States have extended the allowable combined length to 60 or 65 feet. Because of the trend toward longer vehicles, the streets and the docking and maneuvering areas are planned to accommodate the longer legal limits.

Until recently the trucking industry favored 12-foot-wide truck stalls at docking areas. But as trucks get longer they are most difficult to maneuver into the 12-foot stalls. It is better to provide 14-foot-wide stalls, especially for docking areas used for tractor and trailer equipment.

Traffic should circulate in a counterclockwise direction where possible. It is easier for drivers operating large vehicles to make left-hand turns and it is also much easier for them to back into the loading and unloading areas to "dock" their vehicles while making a left-hand turn.

Tractor-Trailer Parking

An area at the end of the truck shed has been designated as tractor-trailer parking. This area can be used by out-of-State truckers who bring in truckloads of such items as watermelons and peaches, which they sell in small quantities directly off their trucks. Truck shed and tractor-trailer parking expansion has been provided in the proposed plan.

Direct Rail Access

About 9 percent of total direct receipts were received by rail. Only 4 percent of fresh fruit and vegetables and slightly over 19 percent of grocery products were received by rail in the Asheville area. One building in the plan has been provided with direct rail access. Rail service might be extended to other buildings if needed.

ESTIMATED INVESTMENT IN LAND AND FACILITIES

The initial investment required to build the proposed farmers' market and other facilities for a food distribution center is estimated at \$3,002,653. Of this total, the farmers' market, farmers' market-related section, and wholesale market would require 16, 9, and 75 percent, respectively, of the investment. The 21.48 acres of land and the specific kinds and amount of facilities planned are based on the need of the firms and groups to relocate. Table 9 summarizes the investment costs for the proposed farmers' market and wholesale food distribution facilities.

TABLE 9.--Estimated investment costs for proposed farmers' market and wholesale food distribution facilities, Asheville, N.C.

Type of facility	Land required ^{1/}	Estimated costs		
		Land	Facilities	Total
	<u>Acres</u>			
farmers' market-----	5.76	\$86,400	\$396,154	\$482,554
farmers' market-related				
section-----	2.36	35,400	228,247	263,647
wholesale market-----	13.36	200,400	2,056,052	2,256,452
Total-----	21.48	322,200	2,680,453	3,002,653

^{1/} The entire development would require approximately 30 acres of land if acres are provided for future expansion. This would increase the total cost land by about \$130,000.

The construction costs are estimates and are intended only as a guide in planning facilities. They are not intended to replace estimates by local architects or engineering firms responsible for actual planning or construction of the project. Details of the costs for buildings and other facilities are given in the appendix. The following tabulation shows the costs of specific buildings, other facilities, and related items by commodity and function.

Farmers' Market

Retail market:

Building (1), 12,000 sq ft of first-floor	
space @ \$5.40 per sq ft-----	\$64,800
Other facilities:	
Paving-----	73,887
Sewers:	
Storm-----	15,976
Sanitary-----	4,218
Sprinklers-----	7,524
Street lighting (standards and distribution lines)-----	5,762
Fencing, gate, and gatehouse-----	3,104
Total cost of building construction and other facilities-----	<u>175,271</u>

Related items:

Architectural and engineering fees-----	10,516
Construction loan-----	18,579
Contingency allowance-----	<u>20,437</u>
Total cost of building, other facilities, and related items-----	<u>224,803</u>

Truck shed:

Building (1), 11,520 sq ft of first-floor	
space @ \$2.72 per sq ft-----	31,334
Other facilities:	
Paving-----	76,903
Sewers: Storm-----	15,976
Street lighting (standards and distribution lines)-----	6,153
Fencing, gate, and gatehouse-----	3,
Total cost of building construction and other facilities-----	<u>133,597</u>

Related items:

Architectural and engineering fees-----	8,016
Construction loan-----	14,161
Contingency allowance-----	<u>15,577</u>
Total cost of building, other facilities, and related items-----	<u>171,351</u>
Total cost of farmers' market buildings, other facilities, and related items-----	<u>396,154</u>

Farmers' Market-Related Section

Garden supply center:

Building (1), 10,000 sq ft of first-floor space @ \$6.12 per sq ft-----	\$61,200
Other facilities:	
Paving-----	45,943
Sewers:	
Storm-----	6,191
Sanitary-----	3,002
Sprinklers-----	6,600
Street lighting (standards and distribution lines)-----	2,247
Fencing, gate, and gatehouse-----	1,884
Total cost of building construction and other facilities-----	<u>127,067</u>

Related items:

Architectural and engineering fees-----	7,624
Construction loan-----	13,469
Contingency allowance-----	14,816
Total cost of building, other facilities, and related items-----	<u>162,976</u>

Nutrition center:

Building (1), 3,500 sq ft of first-floor space @ \$7.49 per sq ft-----	26,215
Other facilities:	
Paving-----	16,905
Sewers:	
Storm-----	2,560
Sanitary-----	1,083
Sprinklers-----	2,625
Street lighting (standards and distribution lines)-----	817
Fencing, gate, and gatehouse-----	685
Total cost of building construction and other facilities-----	<u>50,890</u>

Related items:

Architectural and engineering fees-----	3,053
Construction loan-----	5,394
Contingency allowance-----	5,934
Total cost of building, other facilities, and related items-----	<u>65,271</u>

Total cost of farmers' market-related section buildings, other facilities, and related items-----	<u>228,247</u>
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Wholesale Market

Fruits and vegetables:

Building (1; 6 units, 30 by 100 ft), 18,000 sq ft of first-floor space @ \$11.04 per sq ft and 600 sq ft of mezzanine space @ \$6 per sq ft----- \$220,320

Other facilities:

Paving----- 87,721
Sewers:
Storm----- 11,824
Sanitary----- 5,725
Sprinklers----- 9,042
Coolers, 7,900 sq ft @ \$21.22 per sq ft----- 167,638
Street lighting (standards and distribution lines)----- 4,291
Fencing, gate, and gatehouse----- 3,597

Total cost of building construction and other facilities----- 510,158

Related items:

Architectural and engineering fees----- 30,609
Construction loan----- 54,077
Contingency allowance----- 59,484

Total cost of building, other facilities, and related items----- 654,328

Dairy and poultry products:

Building (1; 5 units, 30 by 100 ft), 15,000 sq ft of first-floor space @ \$11.04 per sq ft and 3,000 sq ft of mezzanine space @ \$6 per sq ft----- 183,600

Other facilities:

Paving----- 71,002
Sewers:
Storm----- 9,565
Sanitary----- 4,631
Sprinklers----- 9,174
Coolers, 2,800 sq ft @ \$21.22 per sq ft----- 59,416
Freezers, 1,300 sq ft @ \$27.54 per sq ft----- 35,802
Street lighting (standards and distribution lines)----- 3,473
Fencing, gate, and gatehouse----- 2,912

Total cost of building construction and other facilities----- 379,575

Related items:

Architectural and engineering fees----- 22,775
Construction loan----- 40,235
Contingency allowance----- 44,259

Total cost of building, other facilities, and related items----- 486,844

Tobacco products:	
Building (1); 7,000 sq ft of first-floor space	
@ \$6.25 per sq ft-----	\$43,750
Other facilities:	
Paving-----	37,594
Sewers:	
Storm-----	5,061
Sanitary-----	2,455
Sprinklers-----	4,620
Street lighting (standards and distribution lines)-----	1,839
Fencing, gate, and gatehouse-----	1,542
Total cost of building construction and other facilities-----	<u>96,861</u>
Related items:	
Architectural and engineering fees-----	5,812
Construction loan-----	10,267
Contingency allowance-----	<u>11,294</u>
Total cost of building, other facilities, and related items-----	<u>124,234</u>
Grocery:	
Building (1), 19,600 sq ft of first-floor space	
@ \$7.10 per sq ft-----	139,160
Other facilities:	
Paving-----	91,885
Sewers:	
Storm-----	12,381
Sanitary-----	5,993
Sprinklers-----	9,504
Coolers, 1,900 sq ft @ \$21.22 per sq ft-----	40,318
Freezers, 3,300 sq ft @ \$27.54 per sq ft-----	90,882
Railroad track, 210 ft @ \$51.68 per ft-----	10,853
Railroad car bumper-----	580
Switch-----	6,800
Street lighting (standards and distribution lines)-----	4,495
Fencing, gate, and gatehouse-----	<u>3,767</u>
Total cost of building construction and other facilities-----	<u>416,618</u>
Related items:	
Architectural and engineering fees-----	24,997
Construction loan-----	44,162
Contingency allowance-----	<u>48,578</u>
Total cost of building, other facilities, and related items-----	<u>534,355</u>
Bakery products:	
Building (1), 14,400 sq ft of first-floor space	
@ \$7.23 per sq ft-----	104,112
Other facilities:	
Paving-----	66,825

Sewers:	
Storm-----	\$9,007
Sanitary-----	4,364
Sprinklers-----	9,504
Street lighting (standards and distribution lines)-----	3,269
Fencing, gate, and gatehouse-----	<u>2,741</u>
Total cost of building construction and other facilities-----	<u>199,822</u>
Related items:	
Architectural and engineering fees-----	11,989
Construction loan-----	21,181
Contingency allowance-----	<u>23,299</u>
Total cost of building, other facilities, and related items-----	<u>256,291</u>
Total cost of wholesale market buildings, other facilities, and related items-----	<u>2,056,052</u>
Total cost of wholesale food distribution center buildings, other facilities, and related items-----	2,680,453

ESTIMATED ANNUAL OPERATING COSTS AND REVENUE REQUIREMENTS

Operating Costs

The expenses incurred in operating the proposed farmers' market and other facilities in the wholesale food distribution center would include expenditures for management, insurance, and maintenance. These estimates are not intended to be all inclusive, but they provide a realistic base for computing operating expenses in the proposed facilities. All these charges have been prorated to the different types of facilities based on the square feet of floorspace proposed in the plan. The annual cost of insurance, maintenance and repair, and reserve for the proposed facilities would total \$21,604 (table 10).

TABLE 10.--Estimated annual costs for insurance, maintenance and repairs, and reserve for proposed farmers' market and wholesale food distribution facilities, Asheville, N.C.

Type of facility	Insurance	Maintenance and repairs	Reserve	Total
Farmers' market-----	\$905	\$1,544	\$245	\$2,694
Farmers' market-related section-----	394	889	128	1,411
Wholesale market-----	8,348	7,560	1,591	17,499
Total-----	9,647	9,993	1,964	21,604

Management

It was assumed that the farmers' market and other facilities of the wholesale food distribution center would be developed in stages and that the farmers' market would be the first of the recommended facilities to be constructed. For purposes of this study no estimate of the cost of a full-time market manager has been included because the North Carolina State Department of Agriculture would probably absorb this and other operating costs, if any, during the initial stages of development. Actual management costs would depend on the needs and services desired by the tenants.

It was assumed that sanitation expenses, such as street cleaning, and public protection would be provided by the municipal government until the center was established. Garbage and trash disposal would be the responsibility of individual firms or stall holders. When the center is fully developed, management might decide to establish the center's own solid waste-disposal system. 6/

Insurance

The North Carolina Fire Insurance Rating Bureau provided background information on estimates for fire and extended coverage insurance. This insurance in 1974 varied from \$0.57 to \$2.51 per \$100 based on 80 percent of the proposed cost of the facilities depending on the type of building and assuming no sprinkler system. Sprinkler-equipped building rates were computed at 45 percent of the preceding rates. Liability insurance covering bodily injury and property damage would be approximately \$1.16 per 100 square feet of building space, with a limit of \$300,000 per accident. Total cost for fire, extended coverage, and liability insurance was estimated at about \$9,500 annually. All insurance rates would be subject to negotiation at the time of construction and would vary depending on the final site selected.

Maintenance and Repairs

The annual cost of maintenance was calculated on the basis of one-half of 1 percent of the cost of buildings and other facilities. This charge would include both normal and preventative maintenance and repair of the proposed facilities. Maintenance and repair costs were estimated at almost \$10,000 annually.

Real Property Taxes

It was assumed that the proposed development would pay taxes on land and facilities. Computations were based on an assessed value of 100 percent of total investment in land and facilities. Taxes were computed at a rate of

6/ For further information concerning solid waste management, see Stearns, Robert P., and Volz, Marvin D., "Solid Waste Management in Wholesale Food Distribution Centers," U.S. Dept. Agr. Agr. Mktg. Res. Rpt. 994, 55 pp., illus. (1973).

\$16.50 per \$1,000 of assessed value. In addition, a 10-percent reserve fund was included to provide for possible increases in current tax rate or reassessments. When a full year's tax payment was accrued, the reserve fund would be discontinued. The total annual tax payment is shown in table 11.

TABLE 11.--Estimated annual income required for real estate taxes for proposed farmers' market and wholesale food distribution facilities, Asheville, N.C.

Type of facility	Assessed value	Income required for--		
		Taxes	Reserve	Total
Farmers' market-----	\$482,554	\$7,962	\$796	\$8,758
Farmers' market-related section-----	263,647	4,350	435	4,785
Wholesale market-----	2,256,452	37,232	3,723	40,955
Total-----	3,002,653	49,544	4,954	54,498

Total Revenue Required

The total revenue required to support the development outlined in the plan for the proposed farmers' market and wholesale food distribution facilities would vary between \$314,272 and \$377,196 depending on interest rates charged for debt service and the period of debt repayment (table 12). Approximately 16 percent of the total revenue would be required for the farmers' market, 9 percent for the farmers' market-related section, and 75 percent for the wholesale market.

Table 13 summarizes the annual rentals per square foot for the market and food distribution facilities. These rents per square foot would range from a low of \$2 for the farmers' market to a high of \$3.96 for the wholesale market depending on amortization periods and interest rates. The information in table 13 was developed by applying data for first-floor space (table 8) to the total annual revenue required (table 12).

BENEFITS AND CONCLUSIONS

Several wholesale food firms in the Asheville area had outdated and inefficient handling operations. Their obsolete, inadequate facilities prevented them from utilizing modern, efficient methods. A new, well-planned food distribution center with a farmers' market would have the necessary type, size, and number of facilities needed by the farmers and wholesalers to provide the kind of food handling required in the area both now and in the foreseeable future.

TABLE 12.--Estimated total annual revenue required at various interest rates amortized for 25 and 30 years for proposed farmers' market and wholesale food distribution facilities, Asheville, N.C.

Operation and tax items, amortization period, and interest rates (percent)	Farmers' market	Farmers' market-related section	Wholesale market	Total
Insurance, maintenance and repairs, and real property taxes-----	\$11,452	\$6,196	\$58,454	\$76,102
Land carrying charge:				
6½-----	5,617	2,301	13,027	20,945
7½-----	6,481	2,655	15,031	24,167
8½-----	7,345	3,009	17,035	27,389
9½-----	8,209	3,363	19,039	30,611
<u>25 years</u>				
Debt service:				
6½-----	32,104	18,498	166,623	217,225
7½-----	35,131	20,241	182,331	237,703
8½-----	38,284	22,058	198,697	259,039
9½-----	41,532	23,929	215,558	281,019
Total:				
6½-----	49,173	26,995	238,104	314,272
7½-----	53,064	29,092	255,816	337,972
8½-----	57,081	31,263	274,186	362,530
9½-----	61,193	33,488	293,051	387,732
<u>30 years</u>				
Debt service:				
6½-----	30,048	17,313	155,952	203,313
7½-----	33,245	19,155	172,544	224,944
8½-----	36,557	21,062	189,732	247,351
9½-----	39,976	23,032	207,475	270,483
Total:				
6½-----	47,117	25,810	227,433	300,360
7½-----	51,178	28,006	246,029	325,213
8½-----	55,354	30,267	265,221	350,842
9½-----	59,637	32,591	284,968	377,196

TABLE 13.--Estimated annual per-square-foot rentals required at various interest rates amortized for 25 and 30 years for proposed farmers' market and wholesale food distribution facilities, Asheville, N.C.

Amortization period and interest rates (percent)	Farmers' market	Farmers' market-related section	Wholesale market	Average
<u>25 years</u>				
6½-----	\$2.09	\$1.98	\$3.22	\$2.83
7½-----	2.26	2.14	3.46	3.04
8½-----	2.43	2.30	3.71	3.27
9½-----	2.60	2.46	3.96	3.49
<u>30 years</u>				
6½-----	2.00	1.90	3.07	2.71
7½-----	2.18	2.06	3.32	2.93
8½-----	2.35	2.23	3.58	3.16
9½-----	2.54	2.40	3.85	3.40

Income from the sale of fruits and vegetables in the 20-county study area was about \$35 million in 1973 (appendix table 15). At the current growth rate this could more than double in 10 years.

The center would provide such benefits to the community as (1) clean, modern, and pleasant surroundings in which to handle food; (2) space in which individual firms could expand and in which new firms and allied industries could provide adequate facilities for the employees and others who buy there; (3) adequate and convenient parking for all vehicles; (4) better protection from vandalism and theft; (5) improved insurance coverage; and (6) a basis for community pride in local industry. In addition, these facilities would help individual firms to comply with regulations concerning sanitation, quality standards, safety, and the environment—all of which are of vital concern to consumers.

APPENDIX

Cost Data for Buildings and Other Facilities

All costs for buildings and other facilities are based on published (1975) construction cost references, adjusted by an appropriate index for Charlotte, N.C. Since building costs for the market and food distribution facilities vary because of the different designs of individual structures, individual per-square-foot estimates are given.

TABLE 14.—Land area and 1960 and 1970 population for 20 western North Carolina counties

County	Land area in 1970	1960 population			1970 population			Difference (1960-70)			
		Urban		Total	Urban		Total	Urban		Total	
		Number	Percent		Number	Percent		Number	Percent		
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
		Urban	Rural	Total	Proportion of total	Places of 1,000-2,000	Other rural areas	Total	Urban	Rural	Total
		Number	Number	Number	Percent	Number	Number	Number	Percent	Percent	Percent
		Per mi ²						Per mi ²			
Avery	245	12,009	12,009	---	---	---	12,655	12,655	---	---	5.4
Buncombe	657	61,482	130,074	175,655	52.2	7,464	61,937	69,401	10.3	12.9	11.5
Burke	511	12,127	52,701	17,186	28.5	1,431	41,747	43,178	41.7	6.4	14.5
Cherokee	452	16,335	16,335	---	---	3,466	12,864	16,330	---	---	---
Clay	209	5,526	5,526	---	---	---	5,180	5,180	---	---	---
Cleveland	468	25,706	40,342	24,651	34.0	2,284	45,621	47,905	4.1	18.7	9.9
Graham	292	6,432	6,432	---	---	---	6,562	6,562	---	---	2.0
Haywood	551	11,227	28,484	11,646	27.9	3,296	26,768	30,064	3.7	5.5	5.0
Henderson	378	5,911	30,252	36,163	28.0	3,572	27,229	30,801	103.1	1.8	18.4
Hickory	491	17,780	17,780	---	---	1,561	20,032	21,593	---	21.4	21.4
Lincoln	297	5,699	23,115	5,293	16.2	4,476	22,913	27,389	7.1	18.5	13.4
Madison	436	3,345	23,397	26,742	30.6	---	21,264	21,264	180.5	9.1	14.6
Macon	513	14,935	14,935	---	---	2,336	13,452	15,788	---	5.7	5.7
Mecklenburg	450	17,217	17,217	---	---	1,623	14,380	16,003	---	7.1	7.1
Mitchell	215	2,504	11,402	13,906	---	2,333	11,114	13,447	100.0	17.9	3.3
Polk	239	11,395	11,395	---	---	1,951	9,784	11,735	---	3.0	3.0
Rutherford	563	14,030	31,061	45,091	30.1	3,307	31,758	33,065	---	6.5	5.0
Swain	524	8,387	8,387	---	---	1,290	6,571	7,861	---	6.3	6.3
Transylvania	382	4,857	11,515	16,372	26.6	---	14,470	14,470	7.9	25.7	20.4
Yancey	312	14,008	14,008	---	---	1,348	11,281	12,629	---	9.8	9.8
Total or average	8,185	153,998	425,648	579,646	30.0	39,738	417,582	457,320	13.9	7.4	1.0
		175,333						632,653			

1/ Of this total, 72,451 were in urbanized areas.

TABLE 15.--Estimated income from sale of crops for 20 western North Carolina counties, 1971-73

County	Fruit and vegetable income			Other crop income			Total crop income		
	1971	1972	1973	1971	1972	1973	1971	1972	1973
Avery	\$557,492	\$386,570	\$655,430	\$2,983,494	\$3,838,182	\$4,410,239	\$3,540,986	\$4,234,752	\$5,065,669
Buncombe	712,175	648,482	618,875	3,658,031	3,976,459	4,267,364	4,370,206	4,624,941	4,886,239
Burke	99,780	89,700	117,170	712,300	860,346	1,203,655	812,080	950,046	1,320,825
Cherokee	159,581	139,506	112,154	505,217	674,626	1,158,956	664,798	814,132	1,271,110
Clay	168,850	167,315	225,195	186,047	253,385	359,797	354,897	420,700	584,992
Cleveland	436,070	572,150	956,353	4,510,043	3,924,706	9,002,510	4,946,113	4,496,856	9,958,863
Graham	88,114	131,558	99,220	437,705	627,120	581,372	525,819	758,678	680,592
Haywood	3,293,369	2,809,315	3,560,648	2,177,618	2,434,614	2,828,569	5,470,987	5,243,929	6,389,217
Henderson	9,115,000	14,049,651	18,107,824	1,509,636	1,502,496	1,470,276	10,624,636	15,552,147	19,578,100
Jackson	433,663	893,452	1,089,550	813,935	1,023,750	2,166,225	1,247,598	1,917,202	3,255,775
Lincoln	865,780	1,033,605	1,192,720	1,728,425	1,745,895	2,832,750	2,594,205	2,779,500	4,025,470
McDowell	267,400	241,000	405,350	915,300	1,095,147	1,356,548	1,182,700	1,336,147	1,761,898
Macon	982,880	1,112,560	1,256,337	1,119,700	1,693,851	2,466,025	2,102,580	2,806,411	3,722,362
Madison	1,356,193	1,253,760	1,123,570	3,695,896	4,536,428	5,190,355	5,052,089	5,790,188	6,313,925
Mitchell	1,360,289	1,199,435	1,374,218	1,572,754	1,679,156	2,341,698	2,933,043	2,878,591	3,715,916
Polk	906,424	811,810	1,348,977	639,085	619,907	879,897	1,545,509	1,431,717	2,228,874
Rutherford	907,701	1,009,253	1,428,399	1,293,504	1,574,660	2,864,312	2,201,205	2,583,913	4,292,711
Swain	277,500	276,500	301,500	350,177	455,450	651,572	627,677	731,950	953,072
Tennessee	369,180	358,635	441,365	1,082,245	1,217,884	1,688,480	1,451,425	1,576,519	2,129,845
Yancey	167,140	194,554	178,732	1,747,708	2,130,722	2,601,281	1,914,848	2,325,276	2,780,013
Total or average	22,524,581	27,388,811	34,593,587	31,638,820	35,864,784	50,321,881	54,163,401	63,253,595	84,915,468

TABLE 16.--Estimated income from sale of crops and livestock for 20 western North Carolina counties, 1971-73

County	Total crop income 1/		Total livestock income 2/		Total farm income 3/	
	1971	1972	1971	1972	1971	1972
Avery-----	\$3,540,986	\$4,234,752	\$5,065,669	\$882,932	\$913,802	\$1,182,632
Buncombe-----	4,370,206	4,624,941	4,886,239	7,295,904	8,137,730	9,654,224
Burke-----	812,080	950,046	1,320,825	1,833,134	1,807,294	2,516,035
Cherokee-----	664,798	814,132	1,271,110	4,587,786	4,532,880	6,800,664
Clay-----	354,897	420,700	584,992	4,416,390	4,458,200	6,623,810
Cleveland-----	4,946,113	4,496,856	9,958,863	9,276,586	9,537,864	13,839,337
Graham-----	525,819	753,678	680,592	121,410	126,322	231,093
Haywood-----	5,470,987	5,243,929	6,389,217	4,064,547	4,698,094	6,109,970
Henderson-----	10,624,636	15,552,147	19,578,100	4,490,479	4,768,957	5,639,202
Jackson-----	1,247,598	1,917,202	3,255,775	690,772	868,126	836,755
Lenoir-----	2,594,205	2,779,500	4,025,470	6,178,307	7,230,215	10,235,960
McDowell-----	1,182,700	1,336,147	1,761,898	1,201,801	1,402,955	1,809,440
Macon-----	2,102,580	2,806,411	3,722,362	3,761,950	4,402,225	6,267,250
Madison-----	5,052,089	5,790,188	6,313,925	2,643,171	2,650,121	3,043,630
Mitchell-----	2,933,043	2,878,591	3,715,916	2,541,790	2,799,646	3,538,082
Polk-----	1,545,509	1,431,717	2,228,874	1,297,042	1,332,347	1,952,942
Rutherford-----	2,201,205	2,583,913	4,292,711	3,223,300	2,995,580	4,518,540
Swain-----	627,677	731,950	953,072	402,315	379,715	1,134,825
Transylvania-----	1,451,425	1,576,519	2,129,845	714,975	774,670	1,639,575
Yancey-----	1,914,848	2,325,276	2,780,013	1,405,960	1,705,384	2,095,345
Total or average--	54,163,401	63,253,595	84,915,468	61,030,551	65,522,127	89,669,311
					115,193,952	128,775,722
						174,584,779

1/ Includes tobacco, cotton, peanuts, corn, soybeans, potatoes, fruits and vegetables, greenhouse and nursery crops, hay and other crops, and farm forestry.

2/ Includes hogs, cattle, other livestock and livestock products, milk, poultry, and eggs.

3/ Includes total crop plus total livestock income for corresponding year.

Costs of other facilities are as follows:

Paving.--Asphalt paving is estimated at \$6.60 per square yard. Estimates of paving costs charged to individual facilities include a prorated share of the cost of paving common streets and parking areas. All paving specifications should conform to those established by the Asphalt Institute.

Sewers.--18-inch storm sewers are estimated at \$14.67 per linear foot and 12-inch sanitary sewers at \$11.67 per linear foot. Cost estimates charged to individual facilities include an allocated share of the cost for a connecting pipe leading to the property line. Storm sewer costs charged to individual facilities include an allocated share of the cost of servicing common street and parking areas.

Sprinklers.--Sprinkler systems are estimated at \$0.66 per square foot of enclosed nonrefrigerated area. This cost is based on installation estimates prepared for similar facilities elsewhere in the area and adjusted by an index to local construction costs.

Street lighting.--Street lighting standards are estimated at \$372 each and distribution lines servicing the lights at \$3.56 per linear foot. Costs to individual facilities are based on a prorated share of the overall costs.

Fencing, gate, and gatehouse.--The chain link fence with barbed wire enclosing the center is estimated to cost \$4.92 per linear foot, a sliding gate \$1,159, and a gatehouse \$1,935. Total fencing, gate, and gatehouse costs were allocated to all the facilities on a pro rata basis.

Cost Data for Related Items

Cost data for related items are estimated as follows: Architectural and engineering fees are calculated at 6 percent of the total cost of building construction and other facilities; construction loan at 10 percent of the sum of the total cost of building construction and other facilities plus the architectural and engineering fees; and the contingency allowance at 10 percent of the sum of the total cost of building construction and other facilities, architectural and engineering fees, and the construction loan. The contingency allowance might be discontinued when a sufficient reserve is acquired.

Nutrition Center Equipment Costs

1 single unit nutrition center with a capacity of 200-800 qt per day depending on the product-----\$2,895.00
It includes--

1 assembly consisting of--
1½ inch galvanized angle iron chassis supporting a 43- by 46-inch stainless steel preparation top that slopes to a center drain; 1 stainless steel top bored for insertion of 4 pressure cookers; 12-inch central stainless steel

shelf; 2 water spraying hoses with quick release nozzles, to one end of which is a removable bracket to support a sterilizer-blancher and atmospheric cooker; a 40/10 pressure-regulating valve; water and steam pipe and valves, 2 steam traps, and water hose for cooker cooling.

1 jar sterilizer-blancher consisting of 16- by 18-inch aluminum bell equipped with 2 side handles, steam hose and fittings, a pan 18 by 5 inches fitted with a perforated copper coil, a steam connection, and drain; may be used as an atmospheric cooker.

1 atmospheric cooker consisting of 16- by 18-inch aluminum bell equipped with 2 side handles, steam hose and fittings, a pan 18 by 5 inches fitted with a drain.

1 pulper-juicer, electric, driven by a 1/6 hp, 120-volt enclosed motor; V belt, $\frac{1}{2}$ - by $1\frac{1}{2}$ -inch drive pulley, 5-ft 3-wire electric cord with male plug; aluminum base and belt guard.

4 blancher baskets, rust proofed, with side handles.

1 steam jacketed kettle, 10 gal, special type 304 stainless steel, provided with 3 stainless steel legs, 1-piece hinged lid, 45 lb/in² ASME (Amer. Soc. Mech. Engin.), and standard sanitary valve.

4 table carts, 24 by 36 inches, 5-inch swivel castors, 1 shelf below formica-covered top, prime painted.

1 exhaust fan, 17 inches, 120 volts, single phase, 60 cycle.

4 pressure cookers #91 $\frac{1}{2}$, polished cast aluminum, pressure gage, pop-off valve, tapped for steam, capacity 16-qt glass jars, fitted with water cooling assembly.

12 jar baskets, wire, chromium plated, each holds eight 1-qt jars.

1 hot water heater, 40 gal, electric or gas.

1 jar lifter, wire with wood handles.

1 spray cooling tank, 2 by 4 by 2 ft.

2 pails, stainless steel.

2 dishpans, stainless steel.

6 paring knives.

6 boning knives.

1 dipper, stainless steel.

1 wood paddle.

1 boiler for single-unit nutrition center:

4.2 hp electric with automatic water feed-----	\$1,364.25
4 hp liquefied petroleum gas fired with automatic water feed-	1,630.68
4 hp oil fired with automatic water feed-----	1,561.13
1 extra 10- or 20-gal jacketed kettle-----	590.00

Note: If water pressure is less than 60 lb/in², add \$405 for pump and reserve tank.

All prices F.O.B. shipping point. These equipment costs are presented for illustrative purposes only and do not constitute a recommendation for a specific brand of product. All prices supplied by the Ball Corp.